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NEWSPAPER

In Hoc Signo...

The U.S. Army Computer Systems Command in Fort Belvoir, Va., has designed this shoulder patch for its personnel. The scarlet thunderbolt denotes the rapid flow of computerized information. The blue diamond at the center symbolizes the decision-making process, and the white sphere suggests worldwide responsibility. The white stars on a field of blue, symbolic of command and authority, allude to the two parent units of the command.

Sharp Increase in CPU Use Under VS Seen Negating 38% Faster Run Times

Benchmarks Give User Mixed Feelings

By Don Leavitt
Of the CW Staff

ATLANTA – By extending the real memory capacity of an IBM 370/145 sufficiently, it may be more cost-effective to operate with OS/MFT than with OS/VS1, according to John C. Hills of Western Electric Co.'s Computer Application Study Organization (Caso), where a series of carefully constructed, well-monitored benchmarks have left mixed feelings about the value of IBM's virtual storage systems.

Other ACM coverage on Pages 3, 4 and 6.

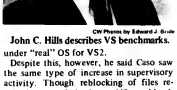
Speaking to an overflow technical session at ACM '73, Hills said the tests had been run on a 145 with 512K real memory with six 3330 disk units on one block multiplexer channel and six 3420-3 tape drives on a selector channel. Adding enough memory to bring the machine to 768K or 1M byte might be the thing to do, he said

No VS Overheads

The additional memory would allow the 145 to support more problem partitions, the use of Hasp for I/O operations and it would provide operating system module residencies, without the excessive supervisory overheads encountered in OS/VS1.

Even though improvements in both computer throughput and job turnaround were experienced at the test site – which was handling both manufacturing and engineering development workloads – Hills said Caso felt the jump in supervisory workload threatened the system by sharply reducing the reserve capacity of the machine.

The tests to evaluate VS2 were marred somewhat, compared with the VS1 benchmarks, Hills noted, in that Western Electric didn't have a 145 operating in MVT mode, which is the counterpart under "real" OS for VS2.



CW Photos by Edward J. Bride

John C. Hills describes VS benchmarks.

Despite this, however, he said Caso saw the same type of increase in supervisory activity. Though reblocking of files resolved some of the heavy I/O workload.

(Continued on Page 2)

User Orientation Rising in ACM?

By Edward J. Bride
Of the CW Staff

ATLANTA – It may be too early to tell, but the Association for Computing Machinery (ACM) appears to be involved in a trend toward increased user activity.

If this is not official "policy," it is certainly the direction many members prefer.

Last week's annual conference indicated ACM's current direction is moving on two fronts: general user management and state-of-the-art. Some people have suggested there are really two separate groups involved in this movement, and the split in emphasis amounts to a schism.

Either way, the increased proportion of user sessions was a general departure from ACM's norm.

There were other "firsts," or at least

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ANALYSIS

Ecological Responsibility Cited

DP 'Key' to Global Management Issues

By E. Drake Lundell Jr.
Of the CW Staff

ATLANTA – "Data processing will play a key note" in the global management of natural resources and in supplying the necessary information to manage those resources successfully, according to Dr. Lewis M. Branscomb, chief IBM scientist and keynote speaker at the Association for Computing Machinery 1973 annual conference.

Because of this need for greater information to manage the world's resources, Branscomb indicated computer science will facilitate the bringing together of varying nations.

"Analysis and management of our common problems on a global scale achieves paramount importance," Branscomb said, as human society moves from a period of scarcity to "an era of managed abundance for all mankind."

But at the same time that technology "will continue to expand the known resources of the world and extend our knowledge of how to use them more effectively, all mankind will have to share in the apportionment of abundance," Branscomb stressed.

Lewis M. Branscomb
"... optimize natural legacy"

Questions of world weather and the effect on crops of various changes in the local climatological conditions "not only make us interdependent, they call for extensive applications of information processing to get the needed data, understand it and predict the consequences of alternative courses of action," Branscomb stated.

More Care Needed

At the same time that "our material aspirations mean we have to use the resources of this world more extensively and intensively than ever before," Branscomb said, "our ecological responsibility means we have to do it with greater care and foresight than ever before.

"In short, we must optimize the management of our natural legacy. By fortunate circumstances, we now command the means to learn to do so. Data processing will play a key note in this global

(Continued on Page 4)

'Think Like Managers'!

By E. Drake Lundell Jr.
Of the CW Staff

ATLANTA – There are a lot of "real practical applications" that need the attention of computer people, but they may have to reorient their thinking in order to solve them.

That was the basic message of John L. Jones, vice-president of management information services for Southern Railway System, at an ACM '73 conference luncheon here last week.

Jones suggested that the theme of the conference, "Computers in the Service of Man," could perhaps be best translated into action at a practical, real world work level.

To do this, he said, computer people are going to have to orient their thinking to bring it more in line with the thinking and practices of the managers and businessmen who run most U.S. industry.

"You can't get management to think like technicians," he said. "It just won't happen."

However, he said that for most of these real world projects to be successful, top management support is needed and top management involvement in the projects is necessary.

(Continued on Page 3)

HEW Group Now Has 'Less Faith' In Technology to Solve Problems

By a CW Staff Writer

ATLANTA – After a year's study of computer systems that contained personal information, most of the members of a government task force on such systems had less faith in the ability of technicians to solve problems with such systems, according to Guy Dobbs, vice-president of Xerox Computer Services, in an address to an ACM '73 group here last week.

In general, he told his audience, most of the members of the group, of which he was a member, had believed at the outset that technology would be developed to protect the privacy of records in such systems and that technology would overcome the potentially harmful effects of such systems.

But after a year of study and debate, he said, the Department of Health, Education and Welfare (HEW) group "left with a reduced faith in technology and tech-

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Sharp Rise in CPU Utilization Under VS Seen Negating Run Times

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OS/VS2 clearly remains a question mark for Western Electric.

Typical Job Stream

For the tests on VS1, Caso built up a benchmark job stream selected from jobs run in-house so as to be representative of the normal workload. Included were some Cobol compiles, Fortran, PL/I and RPG, as well as Sorts and "normal" production work. Some of the smaller jobs were rerun in order to keep the partitions active, Hills said.

With a pageable supervisor of 724K, the evaluators set up four 128K and one 256K virtual partitions. Under "real" OS, the installation had been using two 14K writer areas, a 52K partition and a trio of partitions (128K, 96K and 116K) that ran in time-sliced mode to prevent any particular user from monopolizing the machine.

Twenty-three jobs were in the benchmark job stream, and in standard OS/ MFT they were completed in an elapsed time of 129 minutes. Under OS/VS1, elapsed time dropped to 80 minutes, but CPU utilization – measured by hardware monitor – jumped to 82.2% from the 37.6% rate of use under MFT. In actual times, Hills noted, this meant the CPU was busy 65.8 minutes in the VS environment, but only 48.5 minutes under the older operating system.

Much of the increase in CPU active time was directly attributable to the supervisory activity, he reiterated in reviewing the monitored results. Under OS/MFT, the supervisor had used the CPU only 24.8% of the time, or 32.0 minutes. Under VS1, it took 60.7% of the admitted shorter run time, but this amounted to 48.6 minutes.

"Any Channel Busy" decreased under VS "probably as a result of paged routines and modules remaining resident," Hills went on. The slight increase in Problem Program Time (from 16.5 minutes to 17.2) includes a portion of time required for the paging process, he said.

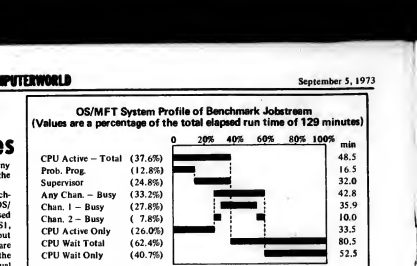
Faster Jobs But . . .

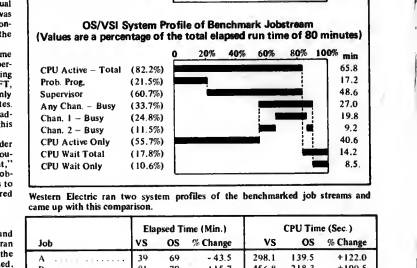
In terms of specific jobs, Caso found that 13 ran faster under VS, seven ran slower than under OS and three jobs ran the same. It should be noted, Hills remarked, that the 13 jobs that ran faster under VS were processed in the two high order partitions. The average decrease in actual CPU time for OS/VS1 was 98% as compared with OS/MFT.

In an attempt to reduce, or at least control, paging rates, Caso ran some of the programs with the V=R option, but, Hills said, a study of SMF data showed more than four times as many seeks were made to SYS1.PAGE data set in V=R as in V=V.

"It appears that although sufficient real memory is available to hold pages in V=R," Hills mused, "the system is not recognizing resident pages and is seeking this data when required."

At another point in his presentation he reported that IBM offered some 14 major suggestions to help Caso get ready for the test, but not all of these were used because it would take too long to evaluate them. "It was not," he admitted, "an optimum tuned system at the time."





Western Electric ran two system profiles of the benchmarked job streams and came up with this comparison.

Job	Elapsed Time (Min.) VS	OS	% Change	CPU Time (Sec.) VS	OS	% Change
A	39	69	-43.5	298.1	139.5	+122.0
B	81	70	+15.7	456.8	218.3	+109.5
C	75	49	+53.0	567.6	326.0	+74.0
D	4	21	-81.0	37.7	9.4	+301.0
E	63	31	+103.0	124.5	47.7	+160.0
F	4	5	-20.0	14.2	5.5	$158.0
G	3	2	+50.0	9.0	4.4	+105.0
H	3	3	0.0	17.7	7.1	+149.0
I	2	3	-33.3	15.1	8.4	+79.0
J	2	2	0.0	7.6	2.7	+181.0
K	4	3	+33.3	24.2	17.6	+37.5
L	34	54	-37.0	417.3	248.8	+68.0
M	13	25	-48.0	117.2	46.5	+154.0
N	4	10	-60.0	39.5	15.8	+150.0
O	3	20	-85.0	38.5	17.0	+126.0
P	3	40	-92.5	12.3	5.7	+116.0
Q	3	2	-50.0	9.0	4.4	+104.0
R	3	2	+50.0	14.3	8.5	+68.0
S	1	3	-66.6	7.8	2.6	+200.0
T	8	17	-53.0	52.6	16.2	+224.0
U	2	4	-50.0	24.7	16.9	+46.5
V	5	4	+25.0	17.5	6.7	+151.0
W	2	2	0.0	20.3	9.7	+109.0

Western Electric generated these individual job statistics when analyzing OS/MFT vs. OS/VS1 on a representative job stream.

Computer Sciences Picks Univac, Cuts Calif. Pact

CW West Coast Bureau

SANTA ANA, Calif. – Computer Sciences Corp. (CSC) has cut the price of its proposed Orange County facilities management contract by $500,000. CSC took its option to pick a Univac 2 x 2 1110 system instead of dual 370/145s.

Contract details are still being worked out but no major problems remain on the $26 million, seven-year contract, officials said.

When and if the contract is signed, it will probably be the first major county in the nation to convert its DP department to facilities management [CW, Aug. 8].

Got a Pain? Tell a Computer

LONDON – Computers will never replace doctors and their famous "bedside manners," but they may soon rival the medics when it comes to diagnosing stomach trouble.

In tests conducted on 550 persons at Leeds University to determine the cause and cure of stomach ailments, senior hospital doctors were wrong 19% of the time and surgeons 28%. The computer, however, erred only eight percent of the time.

The computer appears to be best at spotting appendicitis, but it is capable of diagnosing six other stomach ailments as well.

Group Loses Faith in Technology

(Continued from Page 1)

nologists in solving the problems."

There were four main reasons for this reduced faith in technology, Dobbs indicated, that were uncovered in the group's deliberations.

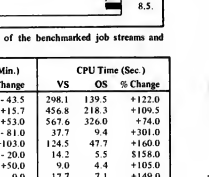
First, he said, the group found in general "most managers of any of the systems did not understand what the systems were doing and what type of protection was provided by the systems."

Secondly, he said, most of the computer technicians interviewed took the attitude that "I'm only a technician" and said they only followed orders from higher levels.

Because of this, the computer technicians would not in general take any responsibility for the systems they were developing and the shortcomings in the privacy protection area.

However, Dobbs found that the policy makers interviewed generally indicated they were waiting for the technicians to answer the problems and therefore they would not accept the responsibility for the systems' shortcomings.

In addition, Dobbs noted, the commit-



Guy Dobbs
". . . users oversold"

tee found the computer professionals had not only oversold the community of users over the potential and effectiveness of such systems, but the technologists had also oversold themselves in the process.

Finally, he said, the committee also found a feeling of self-righteousness on the part of system designers and managers that almost approached a religious fervor.

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'DP Mystique Gone'

Managers, Think Less Like Technicians

By E. Drake Lundell Jr
Of the CW Staff

ATLANTA – Data processing managers should learn to think more like management and less like technicians, Robert C. Mizell Jr. of the Trust Co. of Georgia told an ACM '73 group here last week.

Mizell said that generally top management does not understand computers or computer operations beyond the buzzword level but rather thinks in terms of commitment of resources and expected results – the world of trade and trade-offs.

As a result, DP managers "must move and think in top management's world and not in the technical world," he said.

This is particularly important today, he said, because "the mystique is gone" from DP and management is trying to reapply controls over DP operations that it abdicated in the early days.

The DP manager, he said, can determine how those new controls are applied if he thinks like a top-level manager and develops management tools designed specifically for his operation instead of waiting until some outside controls – which might not fit the DP operation correctly – are applied by executive fiat.

To do this the DP manager should ask himself six questions that are increasingly being asked by top management, and answer those questions from a management point of view.

First the DP manager should answer: "What do we do"? To do this a statement of purpose should be drawn up for each functional area in DP, he said, and those areas that can't be defined should be eliminated. In addition, the DP manager should relate these DP functions to the overall goals of the firm being served.

The second question, he said, is "How well do we do it"?

While he admitted there are no simple yardsticks to answer this question, he claimed managers could do a better job than in the past by measuring the total resources used in a shop against the total resources available for that time period.

The third question to be answered is "Can we do better?"

This problem should be solved like other DP problems by being broken down into its constituent parts to make sure the present methods are the cheapest and most effective available. Then management must be made aware of the possible trade-offs that might have to be made to improve the system, he said.

Another question increasingly being asked by management is "What does it cost?", Mizell said.

All management decisions should have carefully developed cost analyses as part of the planning cycle, he said, even though cost should not be the only consideration in decision-making.

On the other side of the cost ledger, he said, is the question of benefits expected from DP. He declared that DP managers must be careful in delineating the expected benefits from the system.

Next, DPers should be asking, "How safe are we?"

He noted that management would quickly become involved if it was discovered that the DP center was not secure – management would be frightened into caring.

CW Photo by Edward J. Bride

Robert C. Mizell

But he stated this fear could be headed off by DP management asking the same questions about security that would be asked by top management and by performing audits of its operations to ensure they lived up to the stated security levels.

Finally, DP managers should plan their operations effectively – at least as effectively as the rest of management plans for the future, he said.

Think Like Managers

(Continurd from Page 1)

"And I don't mean the controller and his three assistants. I mean the president and the top 10 officers of the corporation."

In addition, he said problems should be attacked in a modular fashion and programming to solve those problems should be done modularly.

As an example, he noted that Southern Railway had recently cut the maximum size program that anyone was allowed to write to 80K and he felt the maximum should probably be even lower.

He also pointed out that Southern Railway never does formalized total system studies of a project.

During the time it takes to do such studies, he said, conditions change and "you end up with a study of conditions that are often two to three years out of date."

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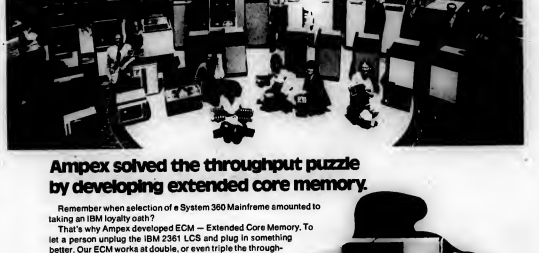

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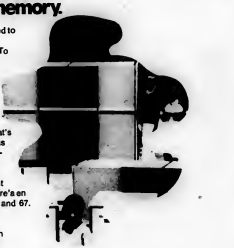

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Branscomb Calls DP 'Key Note' In Global Management Problem

(Continued from Page 1)

management problem."

But while there is a definite need for global resource management, Branscomb claimed "there's simply no intelligent way" to do that "if nations adopt policies of go-it-alone.

"Because the nations of the world have problems and hopes in common, they must seek solutions and opportunities in concert. Put differently, it is not sufficient to recognize problems the nations of the world have in common to assure their solution. We must have the possibility of tackling these problems cooperatively," he declared.

While noting it may be true that many countries without as much computing experience as the U.S. put greater faith in the benefits to be derived from such systems, Branscomb felt the language of computing used in simulation and modeling may enable researchers to "communicate their value-dependent assumptions as well as their input data to one another without the use of culture-dependent language.

An Eye to the Future

"I am convinced that computer simulation is a powerful tool for communicating descriptions of complex systems. As understanding improves and simulations are tested against the data of the real world, they can evolve into programs for managing our own futures," he declared.

"On the shoulders of the information processing community rests the responsibility for convincing the public that we have the tools, if it has the will, to address the complex systems management problems of the future," Branscomb said.

"More than any other profession our community can restore the public's confidence that from the limited resources of the world can be fashioned a life of well-managed abundance for all," he concluded.

Standards – the 'Inescapable Paradox'

ATLANTA – The topic of standards is "terribly misunderstood" in general, according to the man who used to be the director of the National Bureau of Standards.

Dr. Lewis M. Branscomb, now chief scientist at IBM, said there is an inescapable paradox involving standards: they are designed to foster efficiency, but not innovation.

Instead of listing specifications (such as buildings being constructed of two-by-fours, spaced 16 inches apart), Branscomb said standards should be "performance-oriented," leaving to the manufacturers the best technical approach of implementing the standard.

Standards work best where the user is heavily involved in the standards-making process, Branscomb added, noting most users either lack the need for standards because they are so big that they design their own systems, or they are too small and lack the funds for full involvement.

On other matters, Branscomb told a small press gathering following his ACM keynote speech that the technical community in general should adopt a "user point of view" in designing products.

"Science is easier to do than it is to use," he philosophized.

User Orientation Rising in ACM?

(Continued from Page 1)

departures, viewed here last week.

For the first time in about five years, it appears an ACM annual conference will be a profitable venture, to the tune of about $10,000, sources said.

Attendance was slightly over 1,000, down about one-third from last year's total; the 1972 conference was held in Boston, sources noted, where the local attendance was much higher.

CW Photo by Edward J. Bride

Last week's conference also included many standing-room-only sessions on such topics as interpersonal relations and motivation, top-level management involvement, state EDP networks, several vertically-oriented applications sessions, performance measurement, and case studies of virtual memory.

Bachman Award Winner

More Participation

While it is true that some of these sessions had a mixed reception, with some attendees claiming nothing new was being said, there appeared to be a higher percentage of general management sessions and a higher degree of participation by the audience.

And all this was accomplished without diminishing the impact of technical sessions, which included such topics as numerical analysis, design automation and data base administration, with the last topic cropping up in several sessions.

This last fact also highlights an important aspect of the trend. For the first time in ACM's history, a member of the computer industry (rather than the academic community) has received the A.M. Turing Award for contributions to computer science and engineering.

Charles W. Bachman of Honeywell was the recipient, and in his address at the awards luncheon, he chose data base concepts as his lecture topic. In fact, one of the chief reasons for selecting Bachman as the recipient was his early involvement in the Codasyl Data Base Task Group, ACM noted.

One lasting impression left by this year's conference was the message that DP managers must engage in role-playing with both executives and technicians.

The importance of data base concepts, virtual memory, programming techniques and other technical matters was not lost in this environment, but clearly the way is now open for ACM, as an organization, or as two separate groups, to foster this type of interdisciplinary relationship in DP shops.

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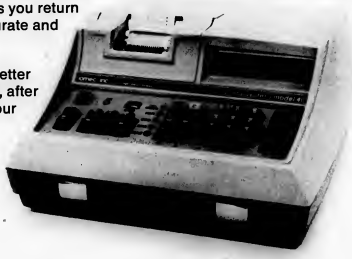

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Interest High in State Nets, University DP Sharing...

...But the Reality Is Less Promising

By E. Drake Lundell Jr.
Of the CW Staff

ATLANTA – Despite a great deal of interest and enthusiasm in statewide networks and computer resource sharing among universities and other institutions of higher learning, the reality of the situation is much less promising.

And, participants agreed last week at an ACM 73 session on "State EDP Networking Activities and University Computing Centers," planning for some networks now under way may not be effective as expected as computers and computing change over the next five to 10 years.

Many Plans

Dr. Charles Mosman of the University of California, Irvine, said a recent survey found 80% of the states presently have some type of plan or program for sharing resources among educational institutions.

But, he indicated, many of these networks are "networks in name only."

At the same time, he found that in many cases the reality of the network did not reflect the optimism of the planning for the network and many such networks get "swamped" in the messy details that are left out of the planning documents.

The ballyhooed idea that states could share none-education computer resources, such as in the bureau of motor vehicles, with educational institutions was "not in fact a reality" and was not being considered seriously in many areas or states.

In addition, he noted today there were few states with active plans or programs for sharing of software among educational institutions and the sharing so far was primarily one of hardware resources.

In the future, he recommended that universities consider all of the options for computing power and not just rush into networking ideas without a real consideration of the alternatives.

How Compatible?

In addition, he said university center managers would have to impress state officials as to how educational computing differs from other state work and in fact "it may not be compatible with the highway department."

Bill Walden of Washington State University stated what became a recurrent theme at the meeting, the major problem with the development of educational networks might not be so much one of management and technology as one of politics.

Legislators were concerned, he noted, with lowering the cost of computing, and because many of the early promises made by computer technicians were not fulfilled they therefore might be a little leery of networks, even though they generally know that technically they can be made to work.

Rex Krueger, director of the computer center at the University of Colorado, said while he was convinced "that networking can enhance institutions," he warned it might not be an effective practice for all cases.

In addition, he said, most of the statewide networks and the universities themselves "have questionable management expertise" to enable them to take on such a large-scale project.

He also said computer center managers in the university environment should be making "more innovative" use of the present resources and they must look at the problems with higher education before advocating expensive network schemes to a public that was largely apathetic when it came to higher education.

Saul Rosen, director of the computer center at Purdue University, claimed that while networks might be acceptable elsewhere, a recent study found they were not right for Indiana.

"Experience with such systems," he said, "has been less than spectacular," and he noted that if the systems had not received heavy subsidies they would not have been attractive economically to the users who have signed on.

A great deal of the pressure for such systems, he stated, was political, but he said educators "should not let political considerations interfere with educational needs."

At the same time he noted that "computers and computing may be at the end of an era," and warned that systems planned today might lock universities into outmoded ways of doing business as advances are made in the technology.

"The ideas of economy of scale may have been valid in the past," he said, "but they might not be in the future."

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Parole Board Review Of Prison Inmates Now Speeded Up

WASHINGTON, D.C. – The Federal Bureau of Prisons (FBP), in a pilot program, is using intelligent terminals to help speed parole decisions to inmates in federal institutions.

In the past, inmates at federal institutions might have waited six to eight weeks before they received the recommendation of the U.S. Board of Parole. Now with the aid of teleprocessing, the parole examiner transmits parole hearing information from the participating institutions to the U.S. Parole Board here. Within a week, the inmates learn the results of the board's review.

The program began in 1971 when the FBP installed Sycor 340 terminals in four of its institutions. The purpose initially was to demonstrate the feasibility of replacing a combination mail and punch card inmate data system with intelligent terminals. Today, the Bureau of Prisons has Sycor terminals in all of its locations.

The 30 federal institutions in the prison network, under the direction of John C. Gluch, telecommunications project director for the bureau, use the terminals to input data on more than 22,000 inmates. The data covers every aspect of the inmate from physical and mental characteristics to educational and vocational skills. Much of this data is used to build a profile of the inmate.

Using this profile, institution staff members can help direct the offender's training program while in the institution and the FBP can help determine how well the institution is meeting the needs of the inmates.

Antitrust, an Historical Perspective -- Part V

Calnetics Case Also Deals With Market Definition

By E. Drake Lundell Jr.
of the CW Staff

One of the most interesting of the recent antitrust cases is Calnetics Corp. vs. Volkswagen of America, Inc. This case presents a new view of the market definition issue, an issue which will be the major problem in the government's case against IBM.

The case, which was relied on heavily by Telex for the market definition portion of its suit against IBM, is currently being appealed in the Ninth Circuit Court of Appeals, and so does not yet have the Supreme Court -- or even an appeals court -- stamp of approval.

But the case may indicate the present judicial feelings on antitrust market definition issues -- and if they are accepted by Judge Sherman Christensen in the Telex case, could further that market definition concept.

Calnetics, a small company making air conditioners for Volkswagens, claimed a Volkswagen takeover of a competing air conditioner manufacturer was anticompetitive.

Volkswagen argued that the market for air conditioners in Volkswagens was not the relevant market, and the court should consider the entire automobile air conditioning market when deciding the case.

In much the same way, IBM argued in the Telex case that the market for peripheral equipment used with IBM equipment could not be considered the relevant market, but rather the entire electronic data processing industry should be used as the standard.

In the government's case, IBM is expected to argue that the government cannot segment a market for "general-purpose" computer systems out of the entire market for computer systems, services, software, etc.

In other words, IBM is expected to say that the only market against which to measure its role will be the entire market for equipment or services that processes data electronically.

Submarket Defined

But in the Calnetics case, the court held that the Volkswagen air conditioners constituted a clearly defined submarket of the entire automobile air conditioning market.

"Analysis shows the fallacy of the assumption" that the court should consider the entire automobile air conditioning market as relevant, the court said.

"Although there is a kinship (in that they accomplish the same purpose -- cool the automobile) between a Buick air conditioner and a Volkswagen air conditioner, the relationship is purely 'shirttail' . . . they simply are not equivalents," the court said.

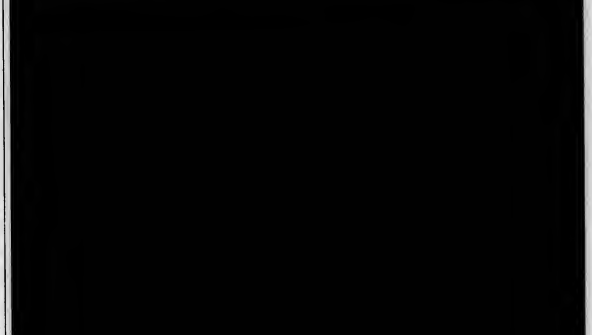
"Equivalents cannot be broad-brushed to minimize or maximize a relevant product market. Limitations are necessary to make the consideration reasonably reflect what actually happens in the marketplace," the judgment continued.

While the case will certainly be important in the Telex judgment, it will also play a role in the government's case in that the government will try to prove that such things as time-sharing and service bureaus do not really compete directly against in-house computer systems in the eyes of most users -- thus eliminating them from consideration when the market is defined.

Cases That Set Precedents

This is the fifth in a series of articles dealing with precedent-setting cases in the field of antitrust law -- cases that may well be cited by both sides in the upcoming government suit against IBM.

Part I of this series covered the historical background of anti-monopoly in the U.S. [CW, June 20]. Part II covered the ferment surrounding the Sherman antitrust act passed in 1890 and now the basic antitrust law of the land [CW, June 27]; Part III covered the Alcoa case [CW, July 4]; and Part IV dealt with the Grinnel decision [CW, July 18].



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Editorials

A Welcome Welcome

"You are peculiarly qualified to shape our world in the years to come," said Gov. Jimmy Carter of Georgia in opening the annual meeting of the Association for Computing Machinery in Atlanta last week.

ACM might perhaps have wished for a less apposite adverb than "peculiarly," but the intent was clear: to express an important and forward-looking executive's recognition of the systems engineering capabilities of our people and our tools.

Reciting the local and state concern for industrial growth and intellectual advancement, but in a context of equal concern for the environment and the consumer, the governor went beyond the usual platitudes of willingness to listen, and described himself as "hungry for what your group can provide."

The profession and the industry are already trying, but will do better with such encouragement.

Congratulations, Grace!

The grand lady of computing has reached another height, in the form of a promotion by the Department of the Navy.

The many friends of Grace Murray Hopper were pleased to see her last week wearing eagles instead of silver oak leaves on her collar, four stripes instead of three on her sleeves.

Congratulations, Captain Hopper.

'Sure It Costs More — But Why Be Half Safe'?

Letters to the Editor

Taylor's Law Reference Is Due 'Jolly Roger'

After reading many of Alan Taylor's columns exhorting people to be more careful and responsible in data processing, I was surprised to find that he is due the Jolly Roger for incorrect information in the Aug. 15 column entitled "Introducing Nokey Fenokey and Other Familiar Friends."

Specifically, the reference to *Rylands* v. *Fletcher* (House of Lords, 1868. L.R. 3 H.L. 330) is all wet – and not with sulphuric acid. As any first-year law student could have told you, that case had nothing to do with the doctrine of attractive nuisance; rather, it is a landmark case establishing the doctrine of strict liability where ultrahazardous activities are conducted.

The defendants in that case constructed a reservoir of water which leaked into plaintiff's underground coal mines, and it was held that

". . . the person who for his own purposes brings on his lands and collects and keeps there anything likely to do mischief if it escapes, must keep it at his peril, and if he does not do so, is prima facie answerable for all the damage which is the natural consequence of its escape."

It strikes me as ironic that an error of this sort would occur in an article devoted to information quality; could it be the result of the Closed Eye mentality – processing (printing) information without testing it (verifying it) first?

Philip M. Walker

Potomac, Md.

Mea culpa. Is data which is collected and then escapes something "likely to do mischief"? If so, it seems I had the right case but the wrong example. A.T.

S/3 Surveyor Looking For Whiz Programmers

In response to David Ferguson's recent article [CW, Aug. 29] concerning the survey of System/3 users I conducted, I must admit to the same conclusions. A close examination of the raw data revealed that Ferguson was not fooled by the averages when he stated that 1.4 programmers per installation seemed low since two assemblers, one Cobol compiler and 21 RPG compilers were reported to have been produced in-house in this sample of 101 installations.

Although one of the assemblers and nine of the RPG compilers reported to have been produced in-house originated at installations with two programmers (one with three), I am inclined to believe the respondents in this case misunderstood the requirements of the questionnaire and were actually responding that they wrote their in-house programs in RPG.

With respect to the applications software, the average installation had about four applications using in-house produced software. I am not so sure as Ferguson that 1.4 programmers would have to be wizards or work 24 hours a day to maintain that level of software.

If there are any System/3 installations with only one programmer who have developed a Cobol compiler, RPG compiler or assembler in-house, I would be as interested as Ferguson in hearing of the circumstances involved.

Richard Fasse
Rochester, N.Y.

DP Stamp Awaited

It remains a mystery to us why a computer stamp has not been issued to date, considering that much smaller countries, considerably behind the U.S., the world leader in computer technology, have done so.

If you agree with us that the origin, development and present far-reaching influence of the computer is deserving of philatelic recognition, drop a note to the Citizen's Stamp Advisory Committee, c/o Executive Functions Group, Washington, D.C. 20260.

Donn W. Sanford
Executive Director
Data Processing
Management Association

There are perhaps three dozen computer stamps in existence today in several countries around the world. It remains a mystery to us, too, that none has been issued for the U.S. Ed.

(Other letters and viewpoints on Pages 9 and 11.)

Open Letter to Univac From CW

Who's Responsible for DP Uses?

(The following is an open letter to Gerald G. Probst, president, Univac.)

Dear Mr. Probst:

This letter is being sent to you after attempts to talk to you and other Univac officials regarding the story on "Secret White House Data Bank Uncovered" [CW, Aug. 1] met with various forms of "no comment."

In the original story, it was reported that Sen. Sam Ervin's Subcommittee on Constitutional Rights tried to obtain certain computerized records from the Office of Emergency Preparedness (OEP). These records are controlled by the Office of Personnel at the White House, are funded with OEP money and are maintained on a Univac 1108 at a secret computer location.

The administration claims these records contain the names and backgrounds of personnel who might be "needed" in case of a national emergency.

But after the disclosure at the Senate Watergate hearings that the White House had investigated many persons considered to be enemies of the Nixon Administration, some non-administration personnel suspected these records might contain data on private citizens such as news reporters. (CBS' Daniel Shorr is one name frequently mentioned).

Following this story, we asked Univac officials if they had any information on how this "secret computer" was operated and if they felt they had any responsibility to determine if any of their leased computers were being used in an illegal manner.

Univac said both questions were philosophical and stated it was only the supplier of these systems, implying it had no responsibility.

Univac was then asked if it had performed any of the actual programming work needed to put this data base on the system. A spokesman answered that even if it had, this was probably a classified operation dealing in national security and hence he could have no comment.

It is not clear if Univac is responsible for how its computers should be used, but it is imperative that the question of responsibility be treated as more than a "philosophic" one.

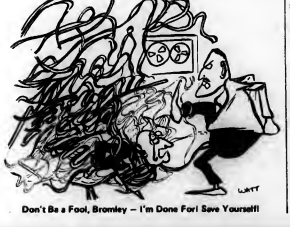
Computer people either are responsible or they are not and it is getting a little late in the game for them to still be playing both sides of the street.

Vendors should make a statement of policy. If they state they are just the makers and operators of the equipment, let it go on the record.

If, on the other hand, the vendors have a social responsibility as you asserted in your keynote address to the 22nd Annual DPMA Conference [CW, July 5, 1972], it would be useful to outline this commitment in concrete terms so that some measurement can be made as to how this spoken commitment can be translated into action.

Awaiting your reply, we remain

Sincerely yours,
Computerworld



Professional Practices

Users, Demand Higher Quality in Cobol Standard!

By Pal Szoke
Special to Computerworld

The ANS X3 Committee is currently endorsing the new Cobol Standard. I feel this standard does not promise significant user improvements in capabilities or efficiency. In fact, it appears to continue the tradition of poor quality standards which dealt the user community a severe blow the only other time a Cobol standard was produced.

I therefore hope the new standard is withdrawn, and that users will demand and obtain better quality standards before any further Cobol standards are promulgated.

To obtain such improved quality standards it will be necessary for users to carefully examine, and improve the decision making processes that are involved in standards determination. However, before this can be considered it is necessary to show that the quality of the work being approved in the Cobol standard area is in fact inadequate. In support of this, here are some of my experiences with the 1968 standard, when as an IBM user I had to "eat their cooking."

Let us consider the history in three areas: Items which have had an adverse effect upon users through their presence in the standard; items whose absence from the standard have hurt users, and items which have no real need to be in the standard, but which have taken up resources which should have been devoted to helping users by handling the previous areas properly.

A. Items Which Have an Adverse Effect By Their Presence.

(1) Restriction of Call Parameters to 01 and 77 Levels

This restriction has set back the development of sophisticated systems at acceptable cost a number of years and created an unnecessary conversion problem for existing major systems while giving no user improvement.

(2) The Required Identation of 01 Level Identifiers.

The requirements to indent 01 level identifiers two spaces to margin B costs tens of thousands of dollars in my own environment. The idea is ridiculous, and again gives the user no advantage.

(3) That Report Writer

The 1968 Standard included a Report Writer which was so poor that it had to be rewritten completely within a few years. Users now face losses of programming investment, production and education. This type of work represents incompetence in standard preparation.

B. Items Which Have Had an Adverse Effect by Their Absence

(1) The Inadequate Perform

We in the outside world have to design complicated communications systems. These need reentrantable facilities in PER. FORM statements. But the standard does not provide for them.

(2) The Lack of Linkage Edit Facilities

Again, the outside world needs to have these facilities, to define external references. The standard has shunned away from providing them – and that has not helped the user with his problems.

(3) The Lack of Bit Definition Capabilities and Bit-Logical Statements

The user who wants to design efficient Cobol systems needs these. The standard does not provide them. Why should limitations be placed upon the development of efficient Cobol systems?

(4) By-Passed 2-Digit-Per-Byte Capabilities

About 35% of our data is control (as opposed to quantity) type numeric. Still there is no acceptable definition capability for such data in the current Cobol standard. This waste of storage has resulted in a significant loss for the world economy as a whole.

C. Items Which Have Had an Adverse Effect by Utilizing Resources in Pursuit of Unsuitable Extensions Within a Single Language

The continuing pursuit of general data base and communications capabilities within the framework of a single language is unnecessary. It represents a lack of understanding of these complicated functions, and should be dropped forthwith.

D. Promotion of Asci Codes

The Asci codes result in inconsistency and inefficiency for 70% of the data processing community. Their promotion and acceptance in Cobol is a disregard for democracy.

I personally cannot afford to monitor the activities of the standards area. Hopefully the publicity given to my objections will lead to publicity about the importance of improving the quality of these standard decisions, and so help the community avoid the serious blow that was taken when the 1968 Cobol standard was approved.

Pal Szoke is the president of International Data Processing Corp., Agoura, Calif.

Letters to the Editor

Why Does DOS/VS Degrade?

In an attempt to isolate the factors contributing to the reduced performance of DOS/VS [CW, Aug. 22], I constructed a simple test program which writes a disk file using various numbers of buffers and work areas. It also made some tests using the standard IBM disk-to-disk utility program. Performance degradation has ranged from zero to 21%. However, I have not yet come up with any sensible theory which explains these variations.

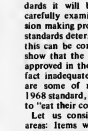
So far the local IBM marketing people have produced only two ideas: somehow find a way to establish a second batch partition and run those programs which are seriously degraded in real mode. They have no better ideas than I have as to how to predict which programs will be seriously degraded.

James S. Aagaard
Northwestern University Library
Evanston, Ill.

Accuracy Vs Adequacy of Information

How Do Readers Interpret Computer Advertisements?

Last April Digital Equipment Corp. ran a series of advertisements entitled: "Does the University of Pittsburgh know something that's escaped you?"



The Taylor Report
By
Alan Taylor, COP

A reader of the Taylor Reports wrote to me and claimed some of the statements in the ad were misleading. He asked me to investigate.

Such requests are honored whenever possible, particularly when they are accompanied (as this one was) by some documentation giving a little background to substantiate the claim and request for investigation.

I have talked to DEC and University of Pittsburgh authorities, and this is my report on the ad.

The reader said he believed parts of the advertisement were misleading. Consider this claim reprinted from the ad.

> A typical system status report shows just how powerful their DECsystem-10 really is: 80 simultaneous tasks, 400 batch jobs queued from remote stations, 7 batch streams initiated, and 40 interactive users.

Three out of these four statistics do indeed show the power of the system – and do so directly. A system that handles 80 simultaneous jobs IS more powerful than one that only runs eight; one with 40 interactive users outperforms one that only copes with four, and one with seven batch streams is better than one with only one or two.

But a system that queues 400 jobs is less powerful (other things being equal) than one that only queues four! Not more powerful.

In fact, at the rate of productivity DEC says the system has (100- to 120 job/hour), a four-job queue would indicate only a waiting time of two minutes before the system started to execute – while the given figure, 400 jobs queued, is a statement that over three hours elapses before work is started on the program.

The statement may just be, therefore, a measure of system weakness, rather than strength. Yet some readers could assume that it was what DEC appears to say it was – a statement of strength.

Under these circumstances the reader thought that its use in this specific context could be regarded as misleading, even though it may be accurate.

Next consider this DEC claim.

> MACRO and BLISS, they've been using the DECsystem-10 for developing their own languages. Like PIL (Pittsburgh Interpretive Language), CATALYST (a CAI adjunct to PIL), TENFOR, a fast load and go student FORTRAN system and a special editor called UPDATE.

Three of the four languages involved were originally developed on the earlier IBM systems (two Model 50s and an IBM 7000 Series system). Then these languages were rewritten to run on the PDP-10. During the rewriting some improvements in implementation did improve their performance.

Readers could assume from the advertisement that these languages had been completely developed on the PDP 10 – which would not be true. Yet any work to change the implementation, could be described accurately as a use of the system "for development."

Again, it appears the advertisement could be both accurate and misleading. The question now is whether such advertisements should not just merely be accurate, but should also be written so that they cannot mislead.

Another DEC claim may be accurate, yet can also be misleading.

DEC Replies

Dear Mr. Taylor:

We thank you for your commentary regarding our March 28, 1973 advertisement in *Computerworld*.

I trust the following responses provide you with a better understanding of our position on the five questions raised by one of your readers:

1) 400 batch jobs queued. A large number of batch jobs queued does not in itself represent a powerful system. It *does* represent a backlog of jobs which have to be run on the system. This figure – 400 batch jobs queued – represents the kind of computing load experienced by the University of Pittsburgh. Our advertisement could have indicated that Pittsburgh runs 1,000-plus batch jobs a day, rather than the number of jobs which are normally queued. However, Pittsburgh's System (typical systems status reports) indicate batch jobs queued rather than a history of jobs.

2) Development of PIL, Catalyst, etc. While PIL and Catalyst were originally developed on the earlier IBM systems, the Decsystem 1055, as indicated, is used for the development of both. It should be noted that language development is an ongoing process (PIL is actually derived from JOSS, a version of which had been implemented on a PDP/6 at the Rand Corp.). The intensetive capabilities of the Decsystem 10 have enabled systems programmers to perform their conversions and continue with the further development of languages like PIL and Catalyst.

3) Student batch turnaround. The definition used for average student jobs not only included Fortran compile-and-go jobs, but those batch jobs which required 30 seconds or less CPU time. The average turnaround time for 41,569 student Fortran compile-and-go jobs was approximately 8.5 minutes during a recent term.

4-5) Sharing systems, files/entire batch and timesharing requirements. The performance figures in the ad were based upon the Decsystem 1055 (dual 10 only), since that was the only production machine at the time. The ad specifically refers to the Decsystem 1055, and only discusses the performance achieved of the 1055.

You will be interested in knowing that since the appearance of the ad, the performance goals of the university have increased, and accordingly, it has added a Decsystem-1077 to the installation.

We look forward to any further comments from your readers, and will be pleased to provide a Decsystem 10 technical summary or application notes representing some of the 120 installations of PDP 10s and Decsystem 10s in colleges and universities around the world.

William Kiesewetter
Manager, Decsystem 10 Marketing
Digital Equipment Corp.
Maynard, Mass.

> Yet batch turnaround was only 15 minutes for average student jobs. And interactive response time was not affected.

Factually, the only jobs which normally get 15 minute turnaround times are fast,

(Continued on Page 10)

Accuracy vs Adequacy

How Are DP Ads Interpreted?

(Continued from Page 9)

Fortran-type compute-and-go jobs which take less than two seconds to run. All other batch jobs have a turnaround measured in hours, rather than in minutes. The computer provides services for graduate students, computer science students, and other undergraduates.

In general, graduate and computer science students use primarily languages other than Fortran, while the rest of the student body uses Fortran heavily.

In March, the number of programs run using Fortran was less than half of the batch jobs run at the center. Center director R.G. Ellis told me he is not aware of any analysis performed before the advertisement was published to substantiate the statement on turnaround.

Then there is the DEC claim about everyone sharing the files with everyone else in the area, no matter what operational system they are running.

> At the same time. And everyone can share the files and software systems with everybody else. No matter what mode of operation they're using.

DEC does not mention in the advertisement that there are two separate DEC systems installed at Pitt – not just one.

There was the dual-processor Decsystem-10 that they do talk about – but also another Decsystem-10 which they appear to ignore.

Some of the terminals and remote job stations around the campus are attached to one processor, and some to the other. The on-line files are not accessible from both processors, but are connected to either one or the other.

So – can everyone share the files? And can everyone share everyone's software systems?

Finally, there is the $64,000 question.

> They've expanded their timesharing.
>
> And expanded their batch to handle 100-120 jobs per hour.
>
> In fact, they've doubled their computer power.
>
> Yet they've cut their computer costs by 30%.
>
> With a 60 terminal, dual-processor DECsystem-10.
>
> Pitt's DECsystem-10 has a common operating system that does all their batch and all their timesharing. At the same time.

Does Pitt's dual-processor Decsystem-10 do all Pitt's batch and time-sharing? The Decsystem-10 advertisement seems to say that it does. I have found out that the dual processor system does not. The unmentioned system does some of it.

It is possible that the "common operating system" (running on the two different, separate machines?) does control this work – but does that make the claim correct?

More to the point. Can anything constructive be done to obviate the risk of misleading DP people when DP products are advertised? There are many people who are involved – the technicians who supply the material, the technical reviewers who check it out, the copywriters who refine the text, etc.

One possible way would be for an outside, independent agency to go over the advertisements, and the back-up and give a "seal of approval." But who would that be? Could they produce results that work? Is it indeed worth bothering about at all?

I have my own opinions – but I look forward to hearing yours.

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How Can Advertising Be Improved?

Please indicate below any items you feel necessary to control the content of DP advertising.

1. Do you think DP advertising could be checked for accuracy by:
   - (a) Review by an independent, technically knowledgeable organization or person?
   - (b) Provision of a public technical back-up for each advertised claim?
   - (c) Requiring a responsible professional to sign all advertisements?
   - (d) Automatic investigation of claims of inaccuracy.

   Do you feel current advertising standards need new controls?_____

   What other approaches would you advocate?_____

2. Do you feel DP advertising needs new controls to prevent misleading ads.

   Would one or more of the approaches listed above be worth the trouble they might cause?_____

   What other approaches would you advocate?_____

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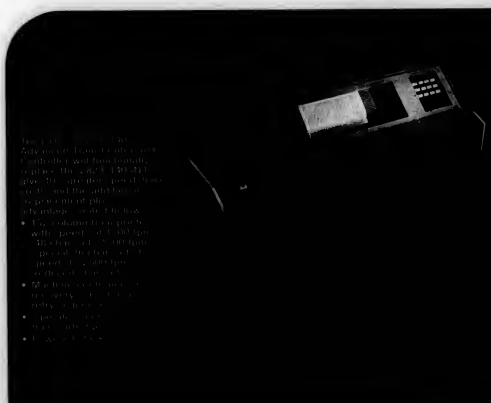

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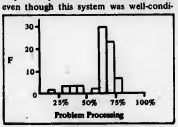
Letters to the Editor

A Review of Drawbacks Of Virtual Memory

The July 4 article on "Virtual Memory Drawbacks Substantial?" quoted me as concluding that 55% of the actual power of the 370/145 under OS/VS1 was the most a user could apply. This is inaccurate.

Attributes of the computing process, typically, are: a single process, left skewed and a big standard deviation. However, the virtual memory systems measured by Computer EKG (hardware) monitoring show significant differences. These are: problem processing is a double process with a right skew; and with four jobs active the standard deviation is small.

To illustrate the first point, the histogram shows 73 points taken every five minutes. Next to it is what a QC engineer might call the "failure rate" curve taken from the histogram. Note the 55% dividing line.

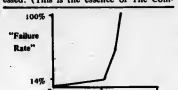


Histogram of 73 Points Taken Every Five Minutes

Not enough is known about VS1 to say why. Perhaps this is the rate of thrashing, even though this system was well-conditioned to have a minimum of external page faults (invalid addresses). Previous measurement work indicates even the internal page fault demands quite a bit of problem processing from the system.

In considering virtual memory, one typically sees an extension in job-elapsed time on the order of 50%. However, problem processing requirements are even higher.

One of the major reasons for going to virtual memory is to get more active partitions, which means more jobs processed. (This is the essence of The Computer Capacity Curve.) Extended work streams indicate that 2.7 to 3.3 average number of active jobs were possible under production conditions. Data collected from a variety of streams is shown in Figure 1.



Failure Rate Curve

With three jobs active, the standard deviation isn't too different from real memory systems. However, with four jobs active the standard deviation becomes small. This is the basis for hypothesizing that 70% to 80% problem processing would be the maximum that could be applied to work streams (not 55%).

Number of Active Jobs	Avg. Prob. Processing	Standard Deviation	Sample Size
3	60%	22.5	38
4	70%	3.7	36

Figure 1. Work Stream Data

The virtual memory decision in 1973 can be an easy one: no or yes (after all, IBM will install it free). Or it can be quite a labor. The point here is virtual ie quite a different process than we are used to dealing with and it has an important bearing on how we manage CPUs.

Donald C. Harder
Professional Engineer
Computer EKG
Cleveland, Ohio

NBS Facility Run On Open-Shop Basis

I wish to correct two misquotes in an article by Don Leavitt entitled, "Planning Eases NBS Change to Exec 8," on page 11 of the Aug. 1 issue.

First, the article quoted me as having said that I have no programmers. Actually, the Computer Services Division has an excellent staff of some 15 programmers and analysts who are responsible for maintaining and enhancing the system support software.

In this connection, they are also responsible for providing training and consultative services to some 1,500 individual users of the NBS central computer facility in all aspects of computer services provided by the division.

What was actually said during the telephone interview with Leavitt was that the NBS computer facility is run on an open-shop basis and the staff of Computer Services Division does not get involved in writing application programs.

In this regard, the article correctly quoted me as saying that we do not have the authority to even evaluate, much less modify, application programs run on the NBS computer. Hence, my interest in the "Programmer Assistance Center."

Second, the article quoted me as being left by the conversion with many " 'confounded problems' resulting from a lack of user training, a lack of training on the part of the systems staff and a lack of familiarization on the part of the operating staff."

As most experienced DP managers know, residual problems following any such conversion are related to hardware, software and procedural difficulties as well as insufficient cumulative experience with the new operating system.

As far as user training is concerned, the staff of Computer Services Division organized and presented a series of Exec 8 seminars tailored specifically to the needs of the users of this computer facility, which was, I feel, an outstanding example of good planning and preparation for a major installation change.

W. Bruce Ramsay
National Bureau of Standards
Washington, D.C.

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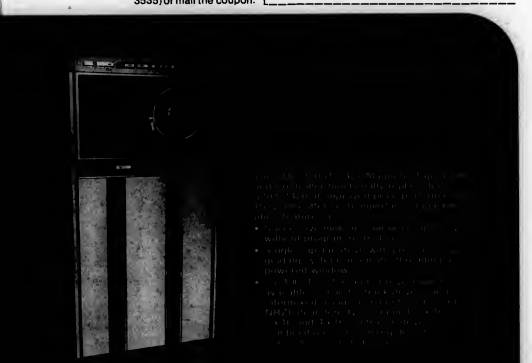

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BEEMAK PLASTICS

IBM User Groups Detrimental to DP

Where Is the True Professional Society?

By Joseph Rigo
Special to Computerworld

There are six steps in the formal systems approach to problem solving:

1. What is the apparent problem?
2. What are the facts?
3. What is the real problem?
4. What are the alternative solutions?
5. What is the best solution?
6. What course of action should be followed?

One reason why the proposed Computer Institute is so vulnerable to attack these days is that its organizers skipped steps 2, 3, 4 and 5.

This, in itself, would be somewhat odd for an organization that plans to certify the professional competence of systems analysts, among others. It is particularly odd considering that the organizers of the institute are experienced and capable people sponsored by two of our leading professional associations, DPMA and ACM.

To this day, however, the organizers cannot say just what the Institute will do once it carries through its plan to abandon the current certification test. They only promise that things will somehow be better once we enter a glittering new world of professionalism.

Viewpoint

But my purpose here is not to attack the institute. Enough people are doing that now. I am more interested in why, after all these years, some of our leading professionals are still trying to build systems that have not been designed.

The six principles are neither new nor secret. Most of us now work under structured project management systems that, however varied, are almost all based on this systematic approach to problem solving. But it has taken a terrible long time to get this far, and many of our smaller installations still haven't caught up.

Part of the problem, I like to believe, is that we still do not have a real professional association for the computer field. We do not have a place where people from all parts of the computer community can get together to discuss common problems and gain exposure to ideas and methods from outside their normal area of concentration.

And, I feel, the reason we do not yet have a real professional association is that the IBM user groups, Guide and Share, have effectively preempted most of the activities that would be needed to make it work.

Responsibilities, Too

Guide and Share have, in reality, become the leading professional associations of our field, but they refuse to accept the responsibilities that go with their position. They just do their thing, keeping their members' noses buried in IBM products. And, in the process, they draw away many of the motivated and talented people that any other organization would need to sustain a reasonable program of computer activities.

Clearly, our current professional associations are very much fragmented. And, clearly, we are nearing the merger stage. ACM and the IEEE Computer Society are getting cozy. And DPMA is talking about joining Afips. It's a start.

The question is whether the merged groups, if they do go through with it, will be any stronger than their predecessors. They will still have Guide and Share to compete with. A more immediate question is how many of our existing groups will survive long enough to even get the merger talks under way.

Death Pangs

Recent news reports indicate DPMA is in serious trouble as a national organization. ACM, meanwhile, has simply got to be on "Dear" old ACM president after another has been saying his latest "gee whiz" accounting system will solve all problems. But the problems persist, and ACM responds by raising dues and cutting back on member services.

ACM has just about reached its limit. It might be able to get another couple of dollars of dues money out of its members, but it is rapidly running out of services to cut. At present, it provides administrative support to its special interest groups and, to a lesser extent, to its chapters. And it publishes several scholarly magazines.

But many of its special interest groups are weak, highly dependent on one or two hard-working individuals, and vulnerable to competition from the user groups. Meanwhile, chapters are agitating for elimination of a rule that requires their members to belong to the national organization.

It can only be a matter of time before ACM has to eliminate one or more of its magazines and make further reductions in its administrative services. Why then will anyone pay $35 a year for membership? For that matter, why does anyone do so now?

Disappearance of national ACM would, I suppose, aid the consolidation of organizations. The stronger special interest groups and chapters would go independent or affiliate with some other association. And ACM members would find something else to join.

But I find it hard to see how we as computer users would really be better off. The basic situation would not have changed very much. We still would not have a real professional association.

I like to think we have identified an apparent problem and started trying to determine the facts. Will we continue? Or will we have to have a dead body to provide motivation?

A Surprising Comparison

INSCO vs. NCSS

Choosing a timesharing service isn't easy. There are a profusion of suppliers offering a wide range of services at widely varying prices. To help cut through the confusion, we offer this first in a series of comparisons between INSCO: Timesharing and other major services. in addition to the latest published prices available, we also compare commonly accepted criteria for selecting a service.

COST	NCSS*	INSCO	Per Cent Savings
Per CPU Second (256K Machine)	$ .38	$ .27	29%
Connect Time (10, 15, 30 Characters/Second)	$10.00	$8.00	20%
Disk Access (Per 1,000)	$ 1.00	$ .61	39%
Disk Storage (Per month per cylinder where cylinder equals 125,000 characters)	**Sliding Rate** $20.00-$10.00	**Flat Rate** $10.00	0 50%

*Based on Published Rates

Programming Language

INSCO
All major programming languages are available, many with proprietory INSCO features.

NCSS
All major programming languages are available, many with proprietory NCSS features. Many special application languages are also available.

Technical Support

INSCO
Complete program development,debugging and checkout services are offered. A 150-man application support staff backs up the technical consultant assigned to your account to help with training, operations and special problems.

NCSS
Program development, debugging and checkout services are offered. The systems development staff averages seven years' experience in time-sharing systems.

Availability

INSCO
Service is available through a nationwide network of 30 centers.

NCSS
Service is available through a nationwide network of 16 centers.

Reputation

INSCO
Sales in 1972 were over $20 million. INSCO's Staff was among the first to provide time-sharing for major commercial applications.

NCSS
Sales in 1972 were over $16 million. NCSS was the first to make Model 67 available in a successful time-sharing system.

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SOFTWARE & SERVICES

Random Notes

RPG-II For Xerox 530 CPU Will Also Run on Sigma 3

EL SEGUNDO, Calif. – An extended version of RPG II, announced recently by Xerox for its 530 computer, will accept specifications from most competitive RPG II compilers and runs on the 530 under the Real-Time Batch Monitor, or on the Sigma 3 equipped with the extended arithmetic option.

The one-pass compiler includes the ability to use ascending and descending record matching keys simultaneously, support for tape or disk spooling of slow-speed I/O and a debug option. The Xerox 530 RPG II will be available free in the fourth quarter of this year.

Module Backs Interest Change For Certificates of Deposit

ORLANDO, Fla. – Florida Software Services Inc. has developed an add-on module allowing users of the company's Certificate of Deposit System II package to change interest rates in the middle of a pay period. With the new module, each bank or branch can specify its own effective date and change any or all interest rates on currently active certificates.

The CD System II software, including the new module, costs $5,800. The module is available separately for use at currently installed CD System II sites, and costs $1,000. FSS is at P.O. Box 2269, 32802.

'Human Resources' Moved to DOS

NEW CITY, N.Y. – The Human Resource System, a personnel information package developed and marketed by Information Science Inc., has now been adapted to run under DOS as well as OS.

The system is modular and may include salary administration, benefits control, manpower planning, management development, and recruitment and employment analysis, in addition to personnel and benefits administration, labor relations and training and education.

HRS is customized and installed under a fixed-price contract, the company noted from 18 New Hempstead Road, 10956.

Consultant Checks DP Security

DALLAS – Professional auditing of a client's DP operations to determine the validity and security of business information processed by computer, is now available through Data Index Inc., a consulting firm recently started by Robert L. McIntire.

The new company will also take on software development assignments for mainframe and minicomputer users. These jobs, McIntire said, can involve hardware selection and installation responsibility. Data Index is at Royal Center Tower, 11300 North Central Expressway, 75225.

Life and Death in DP

'Killing' Called Part of Development

By Don Leavitt
Of the CW Staff

VISTA, Calif. – There really is no reason why there need be a significant number of failures in DP projects in the future, according to Richard G. Canning. In a recent issue of his monthly *EDP Analyzer*, Canning noted that if a project is failing – encountering substantial cost overruns, schedule slippages, inability to produce promised benefits – that fact should be detected early, and the project terminated or modified.

The techniques for information system project management are available, Canning continued. It is a case of pulling them together properly – and then using them, especially using a well-defined technique for killing a bad project before it becomes easier to complete it despite its failings.

The idea of a "creeping commitment" to a project seems most important, he said, since it gives management ("hopefully, the steering committee") several chances to review each project before heavy costs have been incurred. But tied to this type of commitment is a "quick-and-clean project killing technique." Top management must let it be known that the technique is in force and that a project can be terminated at any of the review and approval checkpoints, Canning said.

Just knowing when these checkpoints occur, so that progress can be reviewed, is one of the major advantages of a standardized project development approach, even if the standards vary from one installation to another, Canning noted.

There is, in his view, at least a desirable structure for conducting DP projects, even if the details are tailored to the local situation. In the project selection phase, for example, there are good arguments for a "top-down" approach. Projects should be tied to the goals of the enterprise, and these are often better served by developing a new project rather than trying to modify one that is already operational.

In the early stages, designers too often get involved in the how of a system, before they understand the what, Canning said. Systems work has to be different from programming, and analysts must look at the broader purposes of a proposed project. Without the overview, the programmers will never really know why they are coding in a particular way, he said.

Once the overview is established, however, the total effort has to be divided into separate projects that are small enough to control effectively. This is the basic approach of those who advocate modular programming.

Each DP project is a capital investment and should be economically justified, Canning continued, advocating the "present value" method. This again favors shorter projects with faster benefit return," since the present value of dollar benefits obtained next year is much greater than the dollar benefit gained five years from now."

Canning also urged users to consider a steering committee to ride herd on DP projects. Despite the potential sluggishness of management by committee, this still permits a balanced consideration of the views of various user departments so that a project will not benefit or suffer from the thinking of a single manager.

Canning Publications is at 925 Anza Ave., 92038.

IDMS Geared to Language Specs Of Codasyl Data Base Report

BOSTON – The Integrated Database Management System (IDMS) marketed by Cullinane Corp. is a subset of the April 1971 Codasyl Data Base Task Group Language Specification. It provides IBM 360/370 users with data base facilities for programs written in ANS Cobol or any other host language that supports a CALL statement, or equivalent, in a DOS, OS or VS environment.

Working in 50K bytes, IDMS provides separate capabilities for description and manipulation of data. It also supports a network type of data structure. This combination eases the work of application programmers, and still allows integration of all data and data relationships into a data base which is common to all programs that use it, Cullinane noted:

The network approach permits user definition of structures that are most suitable to the applications that operate on the data, the firm said, and while there is only one complete description of the data base, there may be any number of subdescriptions.

Each of these subdescriptions defines a specific combination of record segments, records, sets and areas that apply to a given application. Programmers do not have to know the entire data base but only that portion that concerns them.

The description/subdescription approach is directly comparable to the Schema/Subschema data description language facilities of the Codasyl report, the spokesman added.

Data manipulation statements can be grouped in three categories, and may be used anywhere in the procedure coding of a user's program. Control statements are used to establish access to a portion of a data base, through OPENs and CLOSEs.

Retrieval statements are primarily concerned with locating information in the data base and making it available to the application program in its Working Storage. Modification statements result in changes to the contents of the data base.

IDMS is ready for immediate delivery and is priced "in the $30,000 range" for a one-time license fee. Monthly leases are also available, Cullinane noted from One Boston Place, 02108.

'Sponge' Shows Idle CPU Time

TRENTON, N.J. – OS/360 managers who admit the value of performance evaluation but feel software and hardware monitors are too expensive and too complicated, now have a limited purpose but low-cost alternative.

They can spend $35 to acquire some meter time but "no" core to use the 150-instruction Sponge program from Performance Development Corp. (PDC).

Sponge reports when the CPU is not being used for something else, even though there are jobs in the system. This situation, generally called the cycled CPU load, comes about when every job then in the system is awaiting the completion of a data transfer operation, PDC explained.

Cycled CPU load can be controlled in at least two ways: external manipulation of the jobs being submitted and appropriate choice of scheduling algorithm within the operating system.

Spone carries a priority level lower than every other job in the system. When it finally executes, it simply cycles through a loop whose timing is known, and outputs its running time.

Sponge therefore provides the user with a report of the cycled CPU load at various times during the day so its value can be correlated with the activity of the system.

This counting keeps the meter going when it would otherwise be idle so there is a cost to the use of Sponge. The counting of idle time may not work effectively on some of the larger 370s, with several types of memory, or in a VS environment, the company admitted; but for simple OS shops, Sponge should be a "useful and interesting tool."

The $35 PDC charges for the package covers both the program deck and documentation for its installation and use, a PDC source said from 32 Scotch Road, 08628.

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Or write Digital Equipment Corporation, Maynard, Mass. 01754. European Headquarters: 81, Route de l'Aire, 1211 Geneva 26.

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Error Checks, Demand Payment Added to 'AP-II'

SAN DIEGO, Calif – Infonational, Inc. has enhanced its Cobol-based Accounts Payable system to allow the user even more relief from clerical chores and more flexibility in handling individual accounts. Like the original package, AP-II can be run on IBM, Honeywell or Burroughs mainframes.

Optional features in the new package include duplicate invoice screening and standard cost variance reporting to protect against intentional or inadvertent errors by the vendor or by the user's data entry section.

The new software also provides demand payment or scheduled payment check writing and check reconciliation as the canceled checks come back through the user's bank.

Modulus-10 check digit verification on vendor codes should go a long way towards stopping instance of checks to the wrong vendor, based on transposition of digits in the vendor code, Infonational said, pointing to another feature of AP-II.

The original package, and the enhanced version, are vouchering systems that provide management with a means of controlling cash disbursements and their related accounting distribution. Features in both new and old systems include automatic discount calculation, due date determination, proration of taxes, discounts and freights, and contract payment generation.

As many as 999 companies can be processed by the system and each may have its own organization coding, accounting controls and choice of reports from the 20 that are available. Accounting records are maintained for preparation of Form 1099 and other tax reports at year-end.

The package operates in 32K bytes under either OS or DOS/360, but works under Burroughs' B2500 or B3500 Master Control Program/B, on Honeywell's OS/2000 and Mod 1 operating systems as well.

The $10,000 system can be ordered from 620 "C" St., 92101.

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Input is Newput- in our September 26th Input Supplement

The input terminal has become the most important development in data processing input since the Hollerith card – which it is fast replacing. Terminals are being used in an amazing variety of applications to capture data right at the source – often entering it directly into the CPU. From large DP centers to your friendly neighborhood supermarket and restaurant, you can find these new input systems (including terminals, OCR and MICR) quietly collecting information. And that's what our Input Supplement is all about.

Edited by Ron Frank, this supplement will look at new equipment, new techniques, and a variety of applications. We'll have stories from users – what they're doing, how they're doing it, and how it's working out. And we'll take a look at what's ahead. Overall, you'll get a fairly complete look at the state of the input art, in our September 26th Input Supplement.

If you're marketing products in this area, you should be advertising in this important supplement. Closing date is September 7th, and more details are available from the nearest *Computerworld* representative, or write to: Judy Milford, *Computerworld*, 797 Washington Street, Newton, Mass. 02160.

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Computer Leasing Seminars

A series of computer financial leasing seminars will be presented jointly by Telex Computer Products, Inc. and Capital Marketing Corporation during September and October. Also in attendance at the seminars will be representatives from one of the largest financial institutes in the country. The seminars will cover financial and operating leases associated with IBM System 370 CPU's, Telex peripherals, and other aspects of profitability associated with leasing for the user.

Two sessions will be held in each of the following cities on the dates indicated:

San Francisco	**Sept. 11**	**Detroit**	**Sept. 26**
Los Angeles	**Sept. 13**	**Cleveland**	**Sept. 27**
Dallas	**Sept. 18**	**New York**	**Oct. 2**
Atlanta	**Sept. 20**	**Boston**	**Oct. 3**
Chicago	**Sept. 25**	**Philadelphia**	**Oct. 4**

Complete information on the seminars, their meeting times and locations is available from these Telex Area Managers:

WALTHAM, MASS.—Al Lucchese, 460 Totten Pond Road (02154), (617) 890-49 -

NEW YORK—Frank Jerd, 6 East 43rd Street (10017), (212) 867-9780

ROCKVILLE, MD.—John Kerr, 6110 Executive Blvd. #222 (20852), (301) 881-7610

MIAMI—Bob McLeod, 7600 Red Road, Suite 305 (33143), (305) 661-7641

CHICAGO—Jerry Johnson, 111 East Wacker Drive (60601), (312) 644-5100

SOUTH FIELD, MICH.—Bill Bones, 21415 Civic Center Drive (48076), (313) 358-1195

SAN FRANCISCO—Bob Hicks, Fibre Board Building, 55 Francisco St. (94133), (415) 398-4888

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Job Accounting, Source Librarian Packages Aid Real, VS Users

NEW YORK – DOS users moving into a Virtual Storage (VS) environment and OS/360 users staying in a "real" storage setting can each benefit from new packages now available from Webster Computer Corp.

Job accounting information for DOS/VS operations, including CPU time, supervisor time and wait time by partition for all five partitions running under VS, is reported with the Virtue software package.

The new machine utilization reporting system is described by Webster as a natural upgrade for users formerly running under the company's DOS Murs package in a "real" DOS environment. Virtue simply extends the techinques developed in Murs to match the increased complexity of a VS setting.

Virtue carries a price of $4,600. Lease and rental plans are available, and current users of DOS Murs will be offered a "very liberal price allowance" if they move up to the more sophisticated package, Webster said.

For those in the "real" world of OS/360/370, Webster's SAMB/OS is built around a job accounting module that taps SMF data. But the package includes three other modules as well: systems analysis, project and budget control, and invoicing.

The basic SAMB/OS module, scheduled for delivery in October, costs $4,800. Each of the add-on modules sells for $750, the company added.

Webster has also added a Source Program Library System (Prolib) to its line for systems running under 360- or 370/OS. This disk-resident librarian contains features common to this type of software: data compression and expansion; resequencing of source statement numbers; creation of previous versions of cataloged programs; and a security key system to prevent unauthorized access.

The system also has the capability, Webster noted, of maintaining mailing lists and similar highly structured file systems. The complete Prolib system sells for $3,000 with no maintenance charges.

Webster, formerly in Danbury, Conn., is now at 1345 Avenue of the Americas, 10019.

FDOS Supports DEC, Nova Users

SANTA ANA, Calif. – The Floppy Disk Operating System (FDOS) recently introduced by Standard Logic Systems Inc (SLSI) for DEC PDP-8 and PDP-11 and Data General Nova users, is designed for use with SLSI's 256K-byte floppy disk system (FDS-8) now in production.

The software is designed for users with 8K or less core memory and requires less than 512 words of resident disk. FDOS provides access to system and user programs stored on the disk.

Files for data and for both source and object code are said to be supported.

The system includes core resident file management routines that allow for loading, editing, assembly, debugging and execution of programs stored on the disk.

The software is available on paper tape or disk cartridge and sells for $300. The FDS-8 hardware includes floppy disk, formatter, interface and enclosure for the DEC or Data General mini.

The basic configuration has room for two floppy disks, but SLSI will sell it with a single disk drive for $2,950. The second disk drive adds $3,500 and each thereafter adds another $1,150 to the system price. SLSI is at 2215 S. Standard Ave., 92707.

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Germany is Europe's largest EDP market, and the German Computer Caravan is a unique, new way for your company to increase its sales there. To get a free brochure, just send in the coupon below. We'll send out the details right away.

The German Computer Caravan Schedule

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Hamburg	Nov. 6-Nov. 8
Frankfurt	Nov. 13-Nov. 15
Berlin	Nov. 20-Nov. 22
Munich	Nov. 27-Nov. 30

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Data Briefs

TV Gains Alphanumerics Through New Controller

ANN ARBOR, Mich. – Ann Arbor Terminals, Inc. has brought out a series of display controllers for superimposing alphanumeric data on ordinary TV picture video in cable TV, closed circuit TV, and videotape recording applications.

The series 204 comes in five input/output configurations: character addressable load; parallel RO, burst load; a cursor addressable load; serial RO, cursor addressable load; or serial KSR, cursor addressable.

The Series 204 can display 64 alphanumeric characters in up to 16 lines of 32 characters. All 512 characters are stored in the internal MOS dynamic shift register memory.

Series 204 controllers cost $930 to $1,155 in single quantity, depending on the interface required to the customer's equipment.

Delivery is 15 days from 6170 Jackson Road, 48103.

Sycor 340 Is 2780-Compatible

ANN ARBOR, Mich. – Sycor's Model 340 intelligent communications terminal now comes in a 2780-compatible version for remote job entry applications.

The RJE configuration includes a 300 cps/min printer, 250 card/min card reader; 7K bytes of programmable memory, binary synchronous communications from 2,000- to 4,000 bit/sec and keyboard CRT display. Three lower-speed printers are available in lower-cost packages.

A card-oriented, intelligent RJE configuration with keyboard, CRT and 300 line/min printer is available for $878/mo, including maintenance. With the 165 char./sec printer (50 line/min), it is priced at $658, including maintenance. The 80 char./sec configuration is available for $463/mo, maintenance included.

Delivery is 30 to 45 days from 100 Phoenix Drive, 48104.

Unit Studies Low-Speed Data

TIMONIUM, Md. – Communications Technology, Inc. is offering a distortion analyzer for 25 to 300 bit/sec teletypewriter and data signals.

The DA-551 uses a graphic display to show the occurrence of each signal transition in a data character or data stream. The actual time of occurrence is displayed relative to the theoretically correct time.

The distortion analyzer costs $2,000 with delivery in 30 days from 1900 York Road, 21093.

User Terminal Needs Met By Mixed Vendor System

By Ronald A. Frank
Of the CW Staff

BOSTON – When a computer/communications network is required to service users operating a variety of on-line terminals, the central site must have built-in flexibilities.

This is the situation at Savings Management Computer Corp., an on-line service bureau for savings and loan and other banking institutions. The company first began on-line services about four-and-a-half years ago. At that time it was an all-IBM shop but since then the mainframe and communications capabilities have been expanded to a mixed system.

The object of the SMCC services is to move subscriber banks closer to electronic funds transfer, according to Art Lemay, president.

Recognizing that client banks must retain the right to select from a variety of terminals, Lemay has provided the SMCC network with flexible teleprocessing capabilities by using DEC processors and PIII communications software.

The SMCC network currently supports 450 terminals using two 360/50s with Calcomp double-density 2319-type disks and Storage Technology 200 in./sec 2430-7 type tape units. One of the major changes to the SMCC network was the addition of dual PDP-11/40s to replace IBM 270X line controllers. The 11/40 processors operate with PIII's 370/6 software and emulate two 2703s and a Bunker Ramo 2228 CRT control unit.

The terminal mix supported by the dual front ends is impressive. Having originally been limited to IBM 2740s and 1060 bank terminals, the expanded network now includes the IBM 2980 which is an updated binary synchronous version of the earlier 1060.

In addition, banks using the DP facilities of SMCC have interfaced terminals supplied by Financial Data Sciences, Inc. Additional equipment which will be in operation soon includes the Olivetti TC 480, NCR 270 and Burroughs TC 700 terminals.

In addition, SMCC provides specialized systems such as payroll savings data, negotiable-order withdrawal (NOW) account processing, money orders and treasurer checks and mag tape reporting for federal and state agencies.

An associated service is the Mortgage Information System which operates with Bunker Ramo CRTs.

The SMCC network operates on Bell 3002 private lines and includes start/stop operations at 134.5 bit/sec on the slow side to 1,200 bit/sec support for CRTs.

CW Photo by Ronald A. Frank

Tom Roan, communications coordinator, shows how lines can easily be switched using four-prong plugs.

One innovation at the central site is that all lines are terminated at four-pin phone jacks. This allows relatively simple switches to alternate facilities when line and/or equipment problems develop, Lemay said.

The phone jacks also allow a technician to plug a phone into a data circuit to provide a quick check on whether a carrier (audible tone) is present.

Nata Asks FCC to Reject Carrier Rules Against Interconnection

WASHINGTON, D.C. – The Federal Communications Commission has been requested to rule that common carriers should not be allowed to permit the interconnection of customer-provided communications equipment for intrastate service.

At issue is a proposal in North Carolina to prohibit the interconnection of customer-provided equipment after Nov. 1, 1973. FW, July 25], and a recent opinion by the attorney general of Nebraska stating that the Nebraska Public Service Commission can prohibit the interconnection of non-carrier equipment for intrastate users.

The FCC was asked to step into the two state situations on the grounds that users desiring to use non-carrier equipment could be adversely affected by the North Carolina, Nebraska and other potential state regulatory restrictions.

The request for rule making was presented by the North American Telephone Association (Nata), which represents suppliers of voice interconnection equipment. The issues raised by Nata also apply to data communications users who have installed non-carrier equipment.

The Nata request, officially designated a "petition for order and declaratory ruling," said that interstate and intrastate facilities furnished to users are essentially the same and any discrimination restricting one of the two types of service would be "unlawful under the federal Communications Act of 1934.

"If the proposed North Carolina rule can be applied to compel a customer to obtain [common carrier] equipment for all intrastate communications needs, the practical effect is to foreclose the interconnection of customer-provided equipment for interstate . . . communications," the petition said.

Some observers feel the interconnection battle and the right of the specialized carriers to provide intrastate services could be opened before other state regulatory commissions unless the FCC acts.

An FCC staff spokesman said the commission will probably request comments from interested parties on the Nata petition to be due sometime during September.

Courier Unit Matches IBM 3270

By Patrick Ward
Of the CW Staff

PHOENIX – Courier Terminals Systems, Inc. has introduced an intelligent CRT master-station that is IBM 2260-compatible, and has peripheral control capability, including provision for 8K or 16K of auxiliary memory.

The Executerm 267 will be competing with the IBM 3270 for users replacing their 2260s. Unlike the IBM 3270, though, it does not require a complete rewrite of 2260 software, but does provide the 3270's peripherals capability and other features at a lower cost, according to a Courier spokesman.

Users will also find the 2260 discipline easier on a program than the 3270 system, the spokesman remarked.

An Executerm 267 with a total of four 1,920 character display screens would lease for $514/mo. The equivalent IBM 3270 configuration would require a controller and a 1,920 character remote controller, and would cost $680/mo, he said.

Adding a printer to this configuration would boost the Courier price by $173 to $687. This would mean a 165 char./sec matrix printer.

A printer would increase the price of the 3270 configuration by $190 to $870/mo, but this would be a 66 char./sec matrix printer, the spokesman said.

The Courier system can also offer 8K of auxiliary memory for $55/mo more, and 16K for $65.

Courier's system does not offer an optional light pen, however, as does IBM's 3270, nor is there a badge reader option, although the spokesman said this has already been developed for the 3270-compatible model Courier plans to bring out. It will be available on the 267.

The first Executerm 267s have been installed. Delivery is 60 days from the firm at 2202 E. University Drive, 85034.

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Modular Motorola Management System For Registration, Housekeeping Control

PHOENIX – Motorola has entered the computerized lodging management business and has developed a CRT terminal for the purpose.

The Inn-Scan 400 system is modular in design to fit varying requirements of hotels or motels with 100 or more rooms.

Prototypes of the first two modules, the Inn-Scan 410 Registration and Room Control System and the Inn-Scan 420 Housekeeping Control System, have already been installed in a 468-room Holiday Inn in Hollywood, Calif. and at other locations.

The system at the Hollywood inn uses a DEC PDP-11/05 with Caelus disk plus a backup 11/05 and disk. Five Motorola-developed CRT terminals are used – two at the front desk, one for management, one at the switchboard and one for the housekeeping staff. Diablo printers are attached to some of the CRTs for hardcopy printouts.

When maids are cleaning rooms, for example, they carry an acoustic coupler about the size of a cassette tape recorder with them for communicating with the housekeeping terminal.

On entering a room, they take a plastic card kept there that has been coded to represent the room, and insert it into the acoustic coupler unit. The maids then dial the computer access number on the phone and insert the phone in the coupler when they receive a tone. By adding keyed-in information, the maid can give her number, the room number and the time and condition of the room.

Maids repeat the process on leaving a room, and then the inspector uses the system to put the room on the available list after it has been checked.

Two additional modules, the Inn-Scan 430 Reservations Control System and the Inn-Scan 440 Guest Accounting System, are set for quantity production by early 1974.

Motorola plans to install 19 Inn-Scan 400 systems in hotels and motels by the end of the year, a spokesman said. The cost of the system at the Hollywood Inn is put at $80,000.

Motorola's Business Systems Unit is at 3102 N. 56th St., 85010.

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CSMA Offers Courses

SILVER SPRING, Md. – The Communications Systems Management Association (CSMA) will offer a one-day introduction to either basic or advanced data communications systems and how to apply them to business problems on Oct. 18 at the Sheraton Hotel.

The basic course includes comparison of data and voice systems; transmission facilities; communications codes; basic data transmission, including principles of modulation; asynchronous and synchronous transmission; introduction to wideband transmission and error detection techniques.

The advanced course entitled "Considerations for Data Communication Network Cost and Efficiency" includes an overview of data communications system components.

The courses, held concurrently, will cost $75 for CSMA members and $85 for nonmembers. The same courses will be held Nov. 16 at the Airport Marina Hotel and Tower in Los Angeles.

Registration information is available from CSMA Headquarters at 1102 West St., Suite 1003, Wilmington, Del. 19801.

Small Nets Get Switching System

CULVER CITY, Calif. – Computer Communications, Inc. has introduced a computerized message-switching system for small-to-medium-size data communication networks.

A typical CCI-7000 Model I configuration includes a CC-701 communications processor, an input/output processor, 32K bytes of core storage, 1.3 M bytes of disk storage, interface modules for 32 low-speed communications lines and a color video display console.

This configuration costs about $125,000 including operational software and turnkey installation, the firm said.

Computer Communications, Inc. is at 5933 W. Slauson Ave., 90230.

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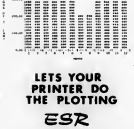

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Bits & Pieces

Unit Converts MCST Data To IBM-Compatible Tape

BLADENSBURG, Md. – The Digi-Data 22 converts IBM Magnetic Card Selectric Typewriter (MCST) data to IBM computer-compatible tape. Edited card information can be transferred to tape at a rate of 50 char./sec.

The system consists of tape recorder and interface and connects to the MCST unit. Purchase price is $4,000; monthly lease price is $175 on a one-year contract from Digi-Data at 4315 Baltimore Ave., 20710.

Xerox Ships First 530

EL SEGUNDO, Calif. – The first Xerox 530 computer system has been shipped to Jordan Dennis Co., a Boston direct marketing service firm.

The computer system is valued at approximately $200,000, and will be used by the firm's Return Data Division to manage a data base of four million records. Acquisition of the Xerox 530 will lead to the expansion of this base to some 55 million records, according to Dan Puccio, president of Jordan Dennis. The computer will also be used for such tasks as marketing information analysis, record sorting and related printing.

S/3 Memory Below IBM Cost

MINNEAPOLIS – The MOD 10+ from Fabri-Tek is a plug-compatible core memory for the IBM System/3. Expansion is up to 64K bytes in 8K-byte increments, under the console or stand-alone, at prices 25% to 50% below IBM's, according to a company spokesman.

The Fabri-Tek add-on memory has the same performance specifications as standard IBM core memory, with no software changes required, the spokesman said.

IBM has accepted the MOD 10+ as either replacement or add-on memory.

The Fabri-Tek memory will be serviced by the firm located at 5901 S. County Road 18, 55436.

Disk System for CAI Minis

HAYWARD, Calif. – CAI 216/116 and Alpha 16 computer users can attach the Model 1101A disk memory and controller subsystem, from Dynaco ustics, Inc. This system features one fixed and one removable 5440 or 2315 disk cartridge to provide over 2.5M words of storage.

Average access time for the drive is 35 msec and data can be transferred at 1.56M bit/sec. The controller provides the word buffering and signal timing for core/disk transmission, using the block I/O and auto I/O data transfer modes of the computer.

Single price is $7,500 and includes disk drive, controller and operating software from 1980 National Ave., 94505.

Virtual Addressing

Largest Sigma Mixes Real-Time, Batch

By Michael Weinstein
of the CW Staff

EL SEGUNDO, Calif. – Xerox has unveiled the largest and most powerful real-time computer in the Sigma computer family.

The Sigma 9 Model 3, together with a new operating system (CP-R), is designed primarily for users who need high-speed processing for real-time applications such as large-volume message-switching, high-speed data reduction, process control, real-time simulation and power utility control.

In addition to the real-time tasks, the Model 3 can run a batch or time-sharing stream in the background. For heavy industrial users who also have a limited number of business applications, this dual capability could work to provide them with one computer for all purposes, a Xerox spokesman noted.

The Model 3 retains the architecture used in the earlier Sigma models. It is program-compatible with Sigma 5 and 8, yet is nearly twice as powerful as the Sigma 5 and has four times the memory capacity of a Sigma 8.

Memory architecture is built around a 32-bit word (four 8-bit bytes) plus parity. Cycle time is 900 nsec with memory available from 32K words to 512K words in 16K-word increments.

Total system memory is made up of memory banks which operate independently of each other and the central processor. This design facilitates internal interleaving and overlapping, the spokesman said.

Ports allow up to 12 separate data paths to memory, he added.

The central processor has a basic configuration of 16 general registers, expandable to 64. Indexing is provided by seven index registers for each group of general registers. Displacement indexing is self-adjusting for all data sizes.

Addressing is either direct, indirect or indexed. Floating point is standard and provides for single and double precision.

The central processor has a separate path to memory enabling complete I/O overlap. Other available features include snapshot registers and programmable clock margins, as well as component isolation and maintenance subcontrollers.

As with other Sigma computers, I/O functions are performed by one or more separate I/O processors, thus leaving the CPU free for hard processing. In the Sigma 9 Model 3, up to 11 I/O processors can be attached, each with a separate path to memory.

Fixed head-per-track random access devices are used for primary on-line data storage. Capacities range from 750K bytes to 6M bytes.

Other peripherals include magnetic tapes, removable disks, card equipment and line printers. For process control, a complete line of analog and digital I/O devices is available.

Operating Software

Operating systems for the Sigma 9 Model 3 include the Batch Processing Monitor (BPM), the Batch Time-sharing Monitor (BTM) and the new Control Program for Real-Time (CP-R).

Under control of CP=R, the computer can handle large real-time applications concurrently with batch processing.

A typical 64K-word configuration can be leased for $11,390/mo on a four-year lease or purchased for $451,100. Deliveries are scheduled for the first quarter of 1974.

Varian 73 Enhanced to Include WCS for Special Microprograms

IRVINE, Calif. – An enhancement to the Varian 73 minicomputer permits users to write their own specialized microprograms using a Writable Control Store (WCS).

The added capability allows users to enter frequently used routines, constants or conversion factors directly into the mini's microprogramming repertoire or into the processor's general-purpose registers, the firm's spokesman said.

The WCS is a high-speed random access bipolar semiconductor memory with a capacity for either 256 or 512 64-bit microinstructions, in models 7041 and 7040, respectively.

The Model 7042 can store 512 64-bit microinstructions, and also allows the user to redefine decoding and I/O control instructions so the Varian 73 can emulate other computers.

Functionally, WCS is an extension of the processor's read-only memory (ROM). Through the use of special code in the standard instruction set it directs the processor to utilize user-written microinstructions, which can be loaded and changed at any time using standard I/O instructions.

The WCS is supported by three software packages: Midas, Micsim and Miutil.

Midas is a microassembler that operates on Varian 620 as well as Varian 73 systems. Microprograms can thus be debugged off-line on another processor, or in the background before they are loaded into the WCS.

Micsim simulates execution of object programs to allow debugging prior to loading a microprogram into the WCS. It also operates on 620 as well as 73 systems.

Miutil is a microutility package including loaders and debugging aids. It requires a Varian 73 system with a WCS module and 8K words of memory.

Minimum price of a 256-word WCS module and power supply is $4,000. All three supporting software packages are free with WCS modules from the firm at 2722 Michelson Drive, 92664.

Testing, Cleaning Systems Handle 6,250 Bit/In. Tapes

WALTHAM, Mass. – Kybe Corp. has introduced five tape management systems to test and clean the 6,250 bit/in. tapes recently announced by IBM, Telex and Storage Technology.

Because these tapes pack information tighter, the chances for errors and lost data are greater, the firm's spokesman explained. While IBM and the others have rated their drives at 6,250 bit/in., after encoding and checking data placed on the tape, the actual density may be in the order of 10,300 bit/in., he said.

As the actual bits are squeezed tighter, a higher frequency is used to read data which leads to a shorter wave length being used.

What all this means to the user is that a particle that was not large enough to disturb a waveform on a 1,600 bit/in. tape may disrupt reading or writing on the denser reels.

The Kybe systems are designated the TMS-70 Models 6 and 7 table-top cleaner/testers, the TMS-200 Models 6 and 7 tape tester/evaluator, and the CS-1600 tape tester/certifier.

The TMS-70 can clean and test a 2,400 ft. reel of tape in under five minutes, the spokesman stated. It counts and charts write-levels, and any physical damage with errors are displayed on a circular inkless chart and digital counter.

The TMS-200 and CS-1600 both have the ability to stop at error position for examining particles to determine dropouts or physical damage caused by the tape drive or other factors. The TMS-200 is used primarily as a tester and evaluator, while the CS-1600 has semiautomatic loading and a positive pressure pneumatic drive.

Prices range from $12 to $21 thousand for these units.

The firm is located at 132 Calvay St., 02154.

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'USE Gives Us Weight,' Univac Users Maintain

By Toni Wiseman
Of the CW Staff

BLUE BELL, Pa. – "We're a sounding board where any user can throw his idea up and, if it gets sufficient support from members, it can carry on to Univac Corp. for action," said John H. Farber, executive secretary of USE, one of the two major Univac user groups.

The group was formed in 1955 by four organizations who were anticipating delivery of 1103As. "In those days," Farber said, "the computer was a very new tool, designed for use but which very few people knew how to use."

Solving Problems

USE, like other user groups, was set up as a conference where users could meet periodically to discuss common problems and look for a solution, rather than having each member reinvent the wheel.

Societies/ User Groups

"One of the things that Univac has done in the year-and-a-half is to bring backroom-type software people to the meetings," said Larry Wadle, USE member with Shell Oil, "the type of people who are otherwise essentially unavailable to a customer but who are really the experts on the difficulties and good points of systems."

Jim Field of White Sands Missile Range feels participation in the group discussions is the main value of membership. "We've gotten a lot of benefits out of them, in the form of information, ideas and programs," he said.

Field also stressed the collective weight of USE to provide a means for influencing what the vendor does.

Group Attack

"In the past few years, USE has taken a strong stand on members jointly coming up with recommendations and going to Univac as a group, rather than individual recommendations being submitted which often address only the symptom, not the problem," according to Mary Gaddy of El Paso Products.

"The organization is maturing and seems to be playing an executive role now in working with Univac," said Wadle, "and Univac responds extremely well with USE, too."

Several members also pointed to the value of the USE Program Library Interchange (Upli). "We are taking advantage of the availability of the programs," said Gaddy. "In some cases they've helped us reduce our run time from 30 minutes to two or three minutes." Upli supplies programs and documentation free of charge to USE members.

Membership is restricted by USE bylaws to users of a "major Univac system," which, according to Farber, up to this point, has been defined by the board of directors to be exclusively 1100 Series equipment.

Membership at this time is between 150 and 200 organizations, according to Farber, "but any employee or individual designated by the member company can attend the semiannual conferences."

The next meeting of USE will be Oct. 15-19 in Minneapolis, at the Radisson Hotel.

Session topics will include Future Features of 1100 Exec, data base size and speed modifications to FMS-8, data center management, a review of the status of Cobol, and 1100 PL/I systems.

In addition to regular sessions, there will be a number of case history presentations and ten workshops. The technical system workshops will cover the areas of run scheduling and selection, communication control routines, console communications and 1100 Series Panic Dump Analyzer.

Attendance at the sessions is restricted to USE members.

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Retailers Meet to Review Point-of-Sale

LOS ANGELES – Is the retailing industry ready for point-of-sale?

This is one of the many questions to be examined at the 15th Annual Electronic Data Processing Conference, sponsored by the National Retail Merchants Association (NRMA).

The conference, Oct. 7-11 at the Los Angeles Hilton, will cover aspects of POS, with 68 sessions scheduled, in addition to several workshops.

Financial considerations, media flow, communications, security and evaluation criteria for economical installation will be discussed.

Other sessions will examine methods for speeding up the flow of merchandise to retailers, the role of the minicomputer in POS and the role of the chief executive in the POS environment.

Source marking, back office system design and standards for the retail industry will also be discussed.

Registration fee is $125 for NRMA members and $175 for nonmembers. Further information is available from Information Systems Division, NRMA, 100 W. 31st St., New York, N.Y. 10001.

Societies/ User Groups

NORTHRIDGE, Calif. – The Computer Society of the Institute of Electrical and Electronics Engineers has announced True Seaborn as the new editor/publisher of *Computer* magazine.

ISA Convenes, Courses Offered

HOUSTON – Technical sessions, short courses, product application sessions and equipment displays will all be sheltered under the roof of the Astrohall as part of the 28th Instrument Society of America Conference and Exhibit, Oct. 15-18.

Six intensive short courses are being offered, among them "Hardware Testing of Digital Process Computers" and "Computer Process Control." The fee per course is $115 for ISA members, $140 for others.

Several clinics of interest to DPers include sessions on minicomputer systems, programmable logic controller applications and process control programming.

Other topics to be discussed during the conference are standardization efforts, on-line process analyzers and the use of real-time languages.

Further information is available from ISA, 400 Stanwix St., Pittsburgh, Pa. 15222.

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DP May Answer Lutherans' Needs...

GREAT FALLS, Mont. – Lutheran congregations throughout the U.S. and Canada are turning to a computer to find the answers to their needs.

As part of a pilot program, sponsored by the American Lutheran Church and Lutheran Church in America (LCA) 175 congregations gathered data about themselves. Using this data and taking into account the membership of the congregation, they decide their priorities, such as increased membership, larger budget, expanded youth programs or new liturgies.

This data is fed into a computer at the LCA's Division for Parish Services in Philadelphia.

The computer in turn prints out a list of existing materials, such as parish education courses and brochures on stewardship.

"There are hundreds and eventually thousands of resources available," said the Rev. Robert N. Bacher of LCA, "and the computer prints these out in relation to what the congregation has said about itself and its needs."

The aim of the project, according to an LCA spokesman, is to establish partnership and interdependence of the local congregations, synods, districts and churchwide agencies.

...Presbyterians Find Their Answer

ATLANTA – If the computer can be considered by some a miracle, what better place for it than in church? The 100-year old Presbyterian Church, as part of a major reorganizational move, is going from three or four service bureau operations to the leasing of a central computer for its new Presbyterian Center here.

Beginning Jan. 1, 1974, all the now far-flung church agencies will be housed together in the center, thereby cutting administrative and travel overhead.

General Accounting

Part of the consolidation movement will be the leasing of either an IBM System/3 or a Honeywell 2020 to perform standard accounting applications – payroll, general ledger, accounts payable, accounts receivable, inventory – and other minor applications, according to Paul Cliff, DP manager for the center.

The Rev. William Henning, new head of the denomination's Central Support Services Division, said the whole streamlining operation will mean substantial savings for the church. "There should be over $100,000 a year in bookkeeping-accounting functions alone," he said.

Computer Takes Heat, Motorists Get Treat

SALT LAKE CITY, Utah – The heat was on in more ways than one when the computer went down at the Bureau of Identification here.

An air conditioning unit malfunction in the computer room caused the temperature to rise, shutting the computer down for most of the day.

With the computer down, vehicle registration and driver-license checks could not be made for Utah's law enforcement agencies. The lucky break for motorists was only temporary, though – the computer easily took care of the backlog of requests the next day.

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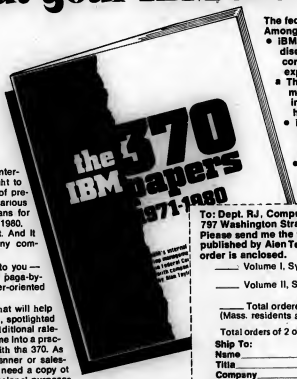

Thanks to actions in Federal Court, IBM's internal papers on its IBM 370 have been brought to light. These "Greybooks" contain a wealth of previously unavailable information on the various models of the 370 — including detailed plans for last year, next year, and every year through 1980. Even IBM salesmen haven't seen most of it. And it can be an invaluable planning tool for any computer installation.

Now these Graybook reports are available to you — in clear, easy-to-read book format — with a page-by-page commentary by the well-known, user-oriented columnist, Alan Taylor.

Almost every page has some information that will help your installation. Alan Taylor's commentary, spotlighted by a specially designed format, provides additional relevent information, and helps make each volume into a practical, useful tool for everyone concerned with the 370. As user, manager, controller, programmer, planner or salesman, there is something here for you. You need a copy of one or more of these books for your professional purposes — and you will want your colleagues to have their own copies so that you can work together.

The facts in these books are fascinating. Among other things they contain are:

- **IBM's own analysis of the advantages and disadvantages of 370 models against the competition. (Your Software and Hardware experts both need this information.)**
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COMPUTER INDUSTRY

CI Notes

NCR-CDC Laboratory Formed

DAYTON, Ohio – National Cash Register Co. and Control Data Corp. have formed the CDC-NCR Advanced Systems Laboratory to develop "an integrated and compatible line of mainframes and software" to be produced by both companies.

The move is another step in the program announced in January 1972. Actual hardware and software implementation will be carried out within the two companies under the cognizance of the Advanced Systems Laboratory, which will be located both near CDC in Minnesota and NCR's DP Division in San Diego.

Navy Selects CMC Key-to-Disk

WASHINGTON, D.C. – The U.S. Navy has awarded a $4.3 million contract to Computer Machinery Corp. for the installation of key-to-disk systems throughout the U.S.

The Keyprocessing systems will be leased with option to purchase, a spokesman said.

"To our knowledge, the dollar value of this new order makes it the largest single key-to-disk contract ever awarded by the U.S. Government," he observed.

The systems will replace keypunches at naval processing centers in the Navy's Supply Systems Command, Ship Systems Command, Air Systems Command/Fleet Air Activities and in the office of the Comptroller of the Navy.

CIA to Discuss AT&T Terminal

CW West Coast Bureau

WASHINGTON, D.C. – The Computer Industry Association (CIA) has scheduled a meeting for Monday, Sept. 17 in Washington, D.C., to discuss the impact of AT&T's Model 40 Da[illegible] in the DP industry.

Jack Biddle, executive director of the association, said the meeting will provide the basis for discussions with representatives of the Federal Communications Commission and the Justice Department's Antitrust Divison.

The CIA is at 16255 Ventura Blvd., Encino, Calif. 91316.

1,100 Univac Terminals Ordered

BLUE BELL, Pa. – Univac has received an order for 1,100 DCT-515 data communications terminals from Auto Tell Services, Inc.

The terminals, a version of the DCT-500 designed especially for the automotive industry, will be used by automobile dealers who subscribe to ATS services.

The order is valued at $7 million. Deliveries are scheduled to begin this month.

Supershorts

Memorex Corp. has formed a special projects group to service the computer media requirements of original equipment manufacturers exclusively.

During its first few months the group will concentrate in the area of special disks, disk packs and disk cartridges.

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Data Computer Systems, Inc., Santa Ana, Calif., has suspended operations and furloughed all employees for one week while attempting to resolve cash shortage problems.

– – –

CIG Computer Products, Inc. has formed CIG Computer Services to service its 360/370 add-on memory products and block multiplexer and selector channels. CIG plans to announce 370/145 and 135 add-on memories next month.

– – –

3M Co. said its Microfilm Products Division is developing a Laser Beam Recorder for the COM user.

In FS System Products

Commanche Technology May Surface

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. – IBM has killed the Commanche tape storage program in favor of the Oak program, but a look at the Commanche technology might be interesting because some products in the Future System (FS) time frame may still contain some of the Commanche technology.

The system was designed at the firm's Boulder, Colo., laboratories over a three-year research period and the investment in time and money will not likely be entirely wasted, especially since the system was designed to give IBM clear technological leadership over its competitors.

The Commanche system, according to IBM Corporate Technical Committee notes, was "planned to span the area of tape replacement and a mechanized tape library. If this approach were to succeed, it might move customers into a new hardware configuration in which IBM would have clear leadership." The papers were revealed in the Telex-IBM antitrust case.

According to company plans as late as the middle of 1971, the system was to have:

- "A fixed storage wall containing as many as 15,000 openings in which each opening can be filled with a small plastic cartridge approximately one inch on each side and three inches long. Each cartridge contains a strip of magnetic tape 12 feet long, and each cartridge is interchangeable with any other cartridge.
- "A cartridge picker and cartridge transport mechanism for automatic extraction of the cartridge from the storage wall, delivery to the read/write station and return to the storage wall.
- "A read/write station for transferring information from and to the tape in the cartridge in the same manner as a conventional half-inch tape drive, and with many of the same operating properties."

The major problems encountered in the program by the IBM engineers, according to an IBM audit of the program, were with the "design and implementation of the read/write station." These problems, they said, "would require significant delays in the program."

The major problems in this area "were that the recording head design, associated electronics and cartridge design are deficient in that they will not support the data rate and reliability performance required of the system," the audit said.

However, the researchers did note that the system could fulfill its goal as a tape library device if given sufficient commitments and an extension in its scheduled completion.

In order to overcome these problems, it was recommended by one of the study groups that the present effort be dropped and that a new design be implemented "with much reduced read/write station size and cost in comparison with the existing equipment," but the team apparently did not recommend dropping the cartridge concept developed for Commanche.

Overall, the top management at IBM concurred with the concept of developing a "new compatible interchangeable media suitable for both single tape drives and library systems," but it did feel that a program aimed at both aspects was too high a risk at the time.

'Hardware Not Problem'

ATLANTA, Ga. – The current technological problems facing the computer industry are in the areas of software and architecture, not in hardware technology, according to Lewis Branscomb, chief IBM scientist.

"I see no prospect of an end to the fantastic march of increased computing power per dollar of costs" on the hardware side of the industry, he said.

"If and when semiconductors run out of steam, other electronic technologies of potentially higher performance are scientifically possible," he said in what may be a warning to the industry that IBM is approaching the breakthrough point in one of these areas.

"The greater challenge is in architecture and software, to make systems more adaptable to the user, more available and more forgiving," he said.

"As simulation, real-time process control and information management progress in sophistication, the time-honored distinction between commercial and scientific computing will merge in [illegible] tions and storage-oriented environment," he said.

IBM Delayed Banking Terminal For Technical Considerations

CW Washington Bureau

WASHINGTON, D.C. – The recent introduction of the IBM 3604 banking terminal is one case where technical considerations outweighed marketing ones in the firm's decision-making process, according to IBM Management Committee notes released recently.

During 1971 a debate arose [illegible] whether IBM should rush to market a similar but not as advanced product as its 27BT banking terminal then under development.

But the Management Committee and its boss, the Management Review Committee, supported the technicians' recommendations to bring out the correct technical program for the system.

But even with this backing, the system slipped its planned announcement date by almost six months, despite repeated warnings that this could cause losses in the marketplace.

All in the Family

The debate in the firm started with a World Trade "nonconcurrence" with the plans of the DP Group to introduce the 27BT in the first quarter of 1973. The disagreement was taken to the Management Committee for resolution.

"World Trade feels, and all agree, that it has definite requirement for a Japanese announcement in October of the same year," the notes indicated, referring to the 27BT system.

"The environment in both countries is such that major banks may make equipment decisions next year. Because of the industry's inclination to use a single vendor, late announcement creates an exposure of some" $10 million in monthly revenues, the notes said.

But while World Trade was stressing marketing, the Systems Development Division (SDD) was disagreeing on technical grounds.

Basic Problem

"While SDD agrees with the marketplace requirement, they feel the announcement of the banking system cannot be expedited. The basic problem is technology," the notes indicated.

"In order to satisfy the broad marketplace, the system must be built of FET logic and probably utilize gas display panels," the committee said, noting that additional resources placed on the program would not answer the technical problems.

The management committee concluded "that because the planning program schedules are technology limited, rather than dollar limited, it makes no sense to [illegible] announcement date."

"To force the announcement of the product in July '72 would require the use of TTL logic technology and CRT and would delay the correct solution in the new technology. In addition, the financial effects of this would not appear to be positive."

As a result, the committee told World Trade "to mount marketing programs based" on the planned announcement in the first quarter of 1973, but at the same time urged the Systems Development Division "to come up with alternatives or expedite basic technology to the point where the systems announcement meets the marketplace requirements."

EEC Planning to Integrate DP

By E.M. Hargreaves
Special to Computerworld

LONDON – The Commission of the European Economic Community has prepared a rough draft of plans to integrate the computer industry in the nine member nations into one by 1980.

Admitting that an earlier plan to integrate just mainframes was not adequate, the commission's plan now includes minicomputers and peripheral equipment within the scope of a proposed new supra-national structure.

The main qualification for membership is that companies involved shall have their decision-making center in Europe – which rules out "multinationals," to which considerable reference has been made.

However, U.S. and Japanese firms willing to share in the program will be admitted, but will not be allowed control of European manufacturing, either direct or indirect.

The plan refers frequently to multinationals and even comes close to naming IBM by referring to one company holding a "dominant position."

It emphasizes the fact that only one-tenth of present computer equipment was designed by Europeans.

The ban on companies without decision-making in Europe is aimed at making the EEC a major source of technological innovation, instead of just an outlet for computers and peripherals which have been designed "mainly in the U.S."

In the transitional period, from 1976-1980, it is suggested that two main "condensation nuclei" be set up to provide closer relationships between all European computer makers.

One would cover manufacturers of large computers, the other minis and peripherals. There may be a third, too, for other firms active in the field.

In 1980, however, all the associations are seen as merging in one consortium covering the entire EEC.

The plan envisages every function likely to cross international boundaries as within the scope of the new organization. It emphasizes this means complete standardization to ensure efficient interconnections of all EEC computer systems and networks.

Service Bureau Gap Widens in Japan

Special from Shukan Computer

TOKYO – The gap is widening here between the larger service bureaus that are increasingly investing in equipment and business improvements and the medium-and small-sized centers.

Within the information processing industry there has been a decrease in the number of enterprises joining the industry following the peak period of 1966-67.

Commonly referred to as an "elongated pyramid," the difference in scale within the industry is quite large.

Medium- and small-sized centers with annual business of less than $1.9 million comprise 80% of the centers, but there is indication that this segment of the industry is unstable due to its dependence on overflow work resulting from increases in their users' work.

Moreover, because their services are strongly characterized by such wage-paying jobs as computations and punching, their profit rates tend to be low.

Service prices tend to tumble from undue competition when the market is dull. As has been the case in the past, future prospects cannot be viewed with optimism.

Unlike the medium-and small-scale centers, the larger centers have the advantage of having the security of spinoffs from enterprise groups and banks, as well as the function of being cooperative investment centers handling capital and group work.

Background in Enterprise

These larger centers are coping effectively with advancements in both equipment and in business. With this kind of machine and system strength plus background in enterprise as their foundation, they are expanding their scale and thus widening this gap.

Some are moving in the direction of assuming the responsibility of think tanks.

Even in their actual work, they are moving from merely providing computation service to starting on-line service by jointly developing specific systems with their users. There is a strong tendency to go beyond simply accepting jobs that flow in.

In tune with this movement, information processing service industries, such as service bureaus, seem ready to greet an era of new developments.

Contracts

IBM Federal Systems Division has been awarded an $8.5 million contract by the Federal Aviation Administration for computer program services in connection with the automation of air traffic control systems.

Systems Control, Inc. has received a contract from Control Data Corp. for the development and implementation of application software programs for an energy control center at Wisconsin Electric Power Co.

PRC Information Sciences Co. has been awarded a three-year contract by the U.S. Navy, to provide development of software for automated Message Processing and Distribution Systems.

Shared Medical Systems has received a contract from Alexian Brothers of America, Inc. to provide a financial and administrative on-line data processing system.

Informatics, Inc. has been awarded a contract from the National Institute on Alcohol Abuse and Alcoholism, National Institute of Mental Health, HEW. Informatics will process data from 41 NIAAA Alcoholism Treatment Centers.

New Market Seen For 2314 Types

NEWTON, Mass. – The new IBM System 3 Model 15 may offer a new market to independent peripherals companies that make 2314 and 2319 compatible disk drives, according to *EDP Industry Report*, published by

The publication noted that IBM probably plans to use the newest addition to its S/3 line to provide homes for 2314 and 2319s now coming off rent as users move to the 3330 disk drive, since the 5445 disk drive for the 3/15 is essentially made of the 2314-type drives.

Mini Monitoring 'One-Armed Bandits'

Special to Computerworld

SYDNEY, Australia – A computer-controlled slot machine monitoring system is now being used to detect illegal manipulations of the machines and can also act as an accounting aid for club management.

The system, marketed by Club and Casino Systems Pty. Ltd. of North Sydney, uses an electronic sensing device fitted inside the slot machine which, in turn, is connected to a minicomputer by cable.

Output can be both visible and audible alarms, as well as printouts on an electric typewriter.

The system can also print out, showing the date and time of day, jackpots on machines and supervisory functions such as opening the various compartments on the machine including the cash box.

For accounts purposes, the system will detail pulls, drops, jackpots, short pays, refills, net profit and percentage yield on the machines that are connected to the system.

With reports that slot machine cheats are defrauding the more than 1,400 registered clubs in New South Wales of millions of dollars a year, the system has aroused widespread interest.

Japanese Technology--Part III

Software Capability May Be Competitive by 1975

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. – While the Japanese currently lack the software capability of the U.S., there is good reason to believe they will close the gap by 1975, according to a report by the Computer Technology/Resources Panel of the Computer Science and Engineering Board of the National Research Council.

But while it is clear the Japanese lag behind the U.S. in software development, there is no way to quantify that lag, according to the report which indicated that in some software areas the Japanese may be equal to or better than the U.S.

For example, they are very active in the area of process control software and "Japanese technology in this area seems to be competitive" with the present U.S. efforts, the report noted.

The Japanese are also capable of producing large and sophisticated applications programs, the report said, noting there are several advanced applications programs installed in Japan.

Japanese Dissatisfied

But despite these sophisticated projects, "there is considerable dissatisfaction in Japan with the state of application software there," the report noted.

"The gap between U.S. and Japanese applications software, which the Japanese seem to feel very keenly, appears to be based not on any lack of technical know-how, but rather on a lack of sufficient emphasis in the past on application packages, and on a lack of trained software people," the report said.

In the area of system software, the report indicated, the Japanese seem to be at a par with the U.S. in the production and use of compilers and "the Japanese capability to produce batch-operating systems also seems to be at or near the U.S. level."

However, in the area of interactive operating systems and data base management systems "we can see clear evidence that Japan lags behind the U.S.," the study said.

To overcome the gaps in software, the Japanese Government has launched a "multi-sided attack on the software problem with the announced goal of overtaking the U.S. by 1975," the study noted.

The main ingredients in this program include the liberalization of the restrictions on the use of the telephone system which cannot presently be used for data, two large-scale computer projects, government financing of software houses and extensive programming education, according to the study.

Standards Effort

Another area of interest to the Japanese, and one "in which the Japanese appear to be going much farther than the U.S.," is in the standardization of software and programming.

The study noted that present research in Japan is aimed at developing "a standard interface language to permit interchange of software among diverse machines.

"If successful, this would represent a great potential savings in the software development effort, but it might also restrict future developments in hardware and systems architecture."

Sanders' 8170 Intelligent Terminal System.

Its intelligence supports all the standard, remote IBM-3270 terminal controls and provides all the remote 3270 functional capabilities with the extra bonus of local printer control and local, programmable data validation features. And Sanders' 8170 system will cost you less money than the 3270.

Sanders has unequalled terminal industry experience. The 8170 system is another addition to a long-established intelligent terminal line and other terminal systems products that go back to the beginnings of business terminal systems. Sanders intelligent terminals are production proven and user proven.

If you're thinking 3270, look into the lower-priced, more-versatile 8170 system. Reliable products, experience, software support and a coast-to-coast maintenance network make Sanders the intelligent answer. Sanders Data Systems, Inc., Daniel Webster Highway-South, Nashua, New Hampshire 03060. Telephone: (603) 885-3727.

Sanders...the intelligent answer

By the Time the Disk Gets Back to Tulsa...

SANTA CLARA, Calif. – Prompt delivery is often the name of the game, and when Computer Sales and Service, a Tulsa, Okla., firm, received an order to install its Stand Alone Small Business System, it was contingent on a very tight delivery and installation schedule. But part of the system is an Iomec disk storage unit and they needed one fast.

To expedite things a bit, Dwight and Marcus Caffee from CSS jumped in a truck and in 26 hours drove nonstop the 1,739 miles to Iomec in Santa Clara to pick up the disk storage system.

Taking 30 minutes to load the unit, they turned around and headed back to Oklahoma and their waiting customer.

New Companies

ROI Computer Co. is now buying and selling computers and computer products in the Pacific Northwest area. The newly formed company also functions as a sales representative of Ampex computer products and CFI Memories.

ROI is located at Island Office Plaza, 2737-77th, S.E., Mercer Island, Wash. 98040.

– – –

American Data Preparation Corp. (ADPC) has recently been formed as a wholly owned subsidiary of National Information Services, Inc. (NIS), to function as an internal support group aiding in systems management contracts.

– – –

FDS/Buffalo Corp., a newly formed subsidiary of Corcan Equities Corp., has begun providing on-line data services to savings banks in western New York and Pennsylvania.

FDS/Buffalo headquarters are at 6680 Chippewa, St. Louis, Mo. 63109.

More than 70 exhibitors and 35,000 computer users are expected at the U.S. Computer Caravan/74

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If you're a marketer, now is the time to act. The Caravan can accomodate 100 booths, and more than half of those have already been spoken for. We have all the facts you need to examine the new EDP marketplace closely, and we'd be glad to go over them with you. Just call Neal Wilder or Dottie Travis at (617) 332-5606. Or write to us at *Computerworld*, 797 Washington Street, Newton, Mass. 02160.

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Wescon Focuses on Mini Competition

SAN FRANCISCO – Sessions at the Western Electronic Show and Conference (Wescon) will focus on the competition between microcomputers, minis and calculators.

Thirty-three sessions are scheduled for the conference which will be held Sept. 12-13 at the Hilton here.

Sessions directly aimed at the computer industry include "Recent Developments in Point-of-Sale Terminal Systems and Markets," "Programmable Controllers," and "Microprocessors and Their Applications."

"Intelligence and Instrumentation," "Calculator-based Systems," and "Computer-Aided Test Design for Automatic Test Equipment" will also be on the schedule.

Other topics related to the computer industry include bipolar device modeling, and hybrid LSI microelectronics.

The number of exhibits is larger than in the past, according to a Wescon spokesman, and includes 30 mainframe and peripheral companies.

Boothe's Farley Switches Posts

SAN FRANCISCO – Boothe Computer Corp. has named John L. Farley Jr., its president for three months, as chairman of the executive committee.

In conjunction with this move, Farley resigned as president. He said the firm would leave the post vacant for the time being.

Executive Corner

The committee has been "empowered by the board of directors to run the affairs of the company," D.P. Boothe Jr., company chairman and chief executive officer, is no longer on the committee.

■ John M. Scandalios has been named a vice-president of Diablo Systems, Inc.

■ Charles E. Wilson has been appointed vice-president, operations for Trendata Corp.

■ Gary J. Iverson, has been named vice-president of engineering of Comten.

■ Philip P. Carville has been named president of the Hardware Division of Computer Exchange Inc. Carville will continue as executive vice-president of Computer Synergy.

■ Benjamin F. Robelen has been appointed vice-president finance and administration, of Prime Computer. He was formerly chief financial officer at Inforex.

■ Adrian Hollander has been appointed vice-president of Culinane Corp. He will be responsible for the corporation's EDP, Auditor System and Services in the Chicago area.

■ G.V. Drake has been named vice-president and director of engineering for Inforex.

■ Robert Oakley has been named computer systems product manager for Varian Data Machines.

Orders & Installations

Beloit Corp. has ordered the Master Schedule and Resource Planning module of Production IV from Informatics, Inc. The Beloit installation will mark the first appearance of the Production IV system in the U.S.

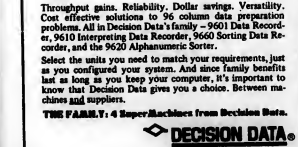
Eastern Airlines has ordered four reservations terminals and 10 MAC-Net message switching terminals from Megadata Computer and Communications Corp., for installation in the airline's Caribbean communications network.

The University of Nevada System has ordered a "library" of student information systems from Systema and Computer Technology Corp.

Kansas State Bank and Trust Co. plans to install an NCR Century multiprogramming computer to expand processing capabilities and permit conversion of its central information file to on-line operations.

Pacific International Computing Corp. has ordered two Univac 1110s to provide computing service to the Bechtel Group of Companies.

IT'S ALL IN THE FAMILY



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Data Documents has reported an inadequate supply of paper as its most pressing problem, but expects continued improvement in sales, which reached $10.1 million in the third quarter ended June 30, up from $7.5 million a year ago.

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The board of DPF has authorized repurchase of an additional $2 million in the firm's convertible subordinated debentures.

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Computer Entry Systems, maker of OCR equipment, has concluded an equity financing package with three concerns, including Allen and Co., a New York investment banking firm.

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Norman Alpert, president of Alpex, said he is on the lookout for developing new directions and business activities for the firm through acquisition and/or internal expansion.

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Itel's SSI Container Corp. subsidiary has arranged a $2.8 million line of credit in France.

Interdata Earnings Rise

OCEANPORT, N.J. – Minimaker Interdata, Inc. reported improved earnings and revenues in the second quarter and six months ended June 30.

Second quarter revenues rose 35% to $4.2 million from $3.1 million in the year-ago period. Earnings, before special credits, rose 112%.

Earnings totaled $278,100 or 14 cents a share, compared with year-ago figures of $253,100 or 13 cents a share which include a $121,900 tax credit.

In the six months, revenues reached $8 million compared with nearly $6 million in the previous year's period. Earnings totaled $550,600 or 27 cents a share compared with $463,800 or 25 cents a share, including a $268,700 tax credit.

"The general purpose and data communications segments of the minicomputer market continued to be strong during the second quarter," President Daniel Sinnott observed.

The firm's order backlog reached a record $6.4 million as of the end of June, he said.

Interdata has reached an agreement in principle with Bankers Trust Co. of New York for a five-year, $3 million to $4 million revolving credit-term loan.

CSC Shows First Quarter Earnings, Hails Infonet's Profitability

CW West Coast Bureau

LOS ANGELES – On its way to the racetrack, Computer Sciences Corp. (CSC) found its best bet was Infonet, the firm's remote processing network.

The software house, now headquartered in El Segundo, gave that message to its stockholders as it explained its loss of the New York Off Track Betting contract and told of improvements in Infonet revenues.

William R. Hoover, chairman and president, said Infonet is "going well" and revenue is nearing $20 million annually.

He expects revenues to improve quarter by quarter and the profitability to improve at an even faster rate.

CSC has sunk about $59 million into startup costs for Infonet plus about $20 million for equipment.

Infonet achieved profitability for the first time in the first quarter ended June 1'3, he said.

Operating results of Infonet included revenues of $5.2 million and earnings, before corporate charges, of $178,000 during the quarter.

CSC earned $181,000 or 1 cent a share in the period compared with a loss of $1.2 million or 9 cents a share in the year-ago period.

Revenues rose to $33.8 million from $26.2 million.

Memorex Changes R&D Accounting

SANTA CLARA, Calif. – After review of its accounting practices, Memorex Corp. has decided to abandon deferrals of research and development and lease acquisition costs.

Such a move will cost the company an estimated $35 million, which was included in the estimated $85 million figure for writeoffs mentioned earlier by the firm [CW, July 18].

A spokesman confirmed the writeoffs would result in a negative net worth for Memorex.

Boothe Holding Talks On Recapitalization

SAN FRANCISCO – Boothe Computer Corp. is holding talks with major creditors in an attempt to develop a plan of recapitalization, according to Chairman D.P. Boothe Jr.

Boothe has asked the American and Pacific Coast Stock Exchanges to halt trading in the firm's common stock and its 5-3/4% convertible subordinated debentures during this period.

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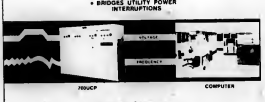

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Earnings Reports

ELECTRONIC DATA SYSTEMS
Year Ended June 30

	1973	1972
Shr Ernd	$1.27	$1.05
Revenue	111,881,718	90,954,821
Earnings	15,199,972	12,603,326

COMPUSCAN
Year Ended May 31

	1973	1972
Shr Ernd	$.52	.....
Revenue	6,104,000	$1,068,000
Tax Cred	372,000	......
Earnings	789,000	(1,726,000)

DATA-CONTROL SYSTEMS
Three Months Ended June 30

	1973	1972
Shr Ernd	$.07	.....
Revenue	1,511,000	$1,358,000
Tax Cred	24,000	.....
Earnings	64,000	(34,000)
9 Mo Rev	3,674,000	3,775,000
Loss	220,000	45,000

CENTRAL DATA SYSTEMS
Year Ended May 31

	1973	1972
Shr Ernd	$.67	$.51
Revenue	7,292,643	2,396,667
Earnings	306,632	228,555

COMPUTER EQUIPMENT
Three Months Ended June 30

	1973	1972
Shr Ernd	$.08	$.07
Revenue	7,181,000	5,613,000
aSpec Cred	50,000	70,000
Earnings	193,000	196,000
6 Mo Shr	.17	.15
Revenue	13,544,000	10,642,000
Spec Cred	100,000	117,000
Earnings	404,000	385,000

a-Primarily tax credits and gain from purchase of debentures.

BOOTHE COMPUTER
Three Months Ended June 30

	1973	1972
Shr Ernd	.....	$.34
Revenue	$13,344,000	a14,204,000
Spec Cred	.....	b850,000
Earnings	(820,000)	757,000
6 Mo Shr	.....	.57
Revenue	24,605,000	a30,202,000
Spec Cred	.....	b1,148,000
Earnings	(1,906,000)	1,238,000

a-Restated to reflect a foreign subsidiary on a consolidated basis. b-From sales of stock of subsidiaries.

INFOREX
Three Months Ended June 29

	1973	1972
Shr Ernd	$.33	$.09
Revenue	9,102,000	5,399,000
Tax Cred	368,000	175,000
Earnings	905,000	204,000
6 Mo Shr	.63	.....
Revenue	16,855,000	9,656,000
Tax Cred	707,000	175,000
Earnings	1,718,000	10,000

DPF
Year Ended May 31

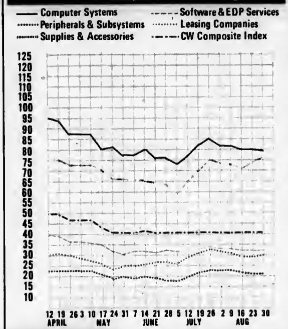
	1973	1972
Shr Ernd	$.08	.....
Revenue	33,926,000	$42,324,000
Spec Cred	419,000	.....
Earnings	345,000	d(34,744,000

d-Includes $42.3 million charge from change in depreciation method and $7.9 million credit from reversal of deferred income taxes.

STORAGE TECHNOLOGY
Three Months Ended June 29

	1973	1972
Shr Ernd	$.42	$.22
Revenue	11,706,000	5,889,000
Tax Cred	520,000	342,000
Earnings	1,431,000	725,000
6 Mo Shr	.91	.30
Revenue	23,040,000	9,580,000
Tax Cred	1,165,000	441,000
Earnings	3,120,000	932,000

COMPUTERWORLD Computer Stocks Trading Indexes



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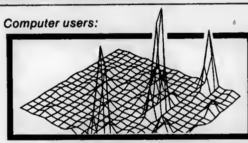

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Computerworld Stock Trading Summary

TRADE*QUOTES

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02139

EXCH		1973 RANGE (1)	CLOSE AUG 30 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	211-245	229 1/R	+5 1/4	+2.3
N	COLLINS RADIO	16- 28	25 1/0	0	0.0
O	COMPUTER AUTOMATION	5- 16	12	+2 1/4	+23.0
N	CONTROL DATA CORP	31- 62	33 3/4	-1 5/8	-4.5
O	DATA GENERAL CORP	2R- 46	45	+5 1/4	+13.2
O	DATAPOINT CORP	10- 21	9 3/4	0	0.0
O	DIGITAL COMP CONTROL	2- 6	3	+ 1/4	+9.0
N	DIGITAL EQUIPMENT	73-105	8R 1/2	- 1/8	-0.1
N	ELECTRONIC ASSOC.	4- 9	4 1/2	+ 1/8	+2.8
A	ELECTRONIC ENGINEER.	6- 11	9 1/2	+ 1/8	+1.3
N	FOXBORO	23- 37	36 3/4	+1 1/4	+3.5
O	GENERAL AUTOMATION	22- 55	36	+3	+9.0
O	OPI COMPUTER CORP	1- 3	1 3/P	0	0.0
N	HEWLETT-PACKARD CO	73- 95	RI 1/8	+3 3/8	+4.3
N	HONEYWELL INC	9R-139	108 3/4	+3 3/4	+3.5
N	IBM	290-340	303 1/4	+4	+1.3
O	INTERDATA INC	7- 13	7 7/8	- 1/8	-1.5
N	MEMOREX	2- 19	4 7/8	0	0.0
O	MICRODATA CORP	2- 10	2 1/2	- 1/4	-9.0
N	NCR	27- 38	34 3/4	+ 1/4	+0.7
N	RAYTHEON CO	22- 34	24 3/4	- 1/2	-1.9
N	SINGER CO	45- 74	51 1/4	+3 1/4	+6.7
N	SPERRY RAND	36- 50	49 1/4	+1 3/8	+2.8
A	SYSTEMS ENG. LABS	3- R	3	- 1/2	-14.7
N	TEXAS INSTRUMENTS	83-110	105 3/4	+2 1/8	+2.0
D	ULTIMACC SYSTEMS INC	1- 11	3	0	0.0
N	VARIAN ASSOCIATES	10- 20	13 3/4	+1 3/8	+11.1
N	WANG LABS.	13- 34	20 5/8	+1 1/4	+6.4
N	XEROX CORP	141-169	154 1/8	+4	+2.6
	LEASING COMPANIES				
A	BOOTHE COMPUTER	1- 5	1 1/8	TRADING HALTED	
O	BRESNAHAN COMP.	1- 7	2 1/8	+ 1/8	+6.2
O	COMDISCO INC	6- 17	5 3/4	- 1/2	-8.0
O	COMMERCE GROUP CORP	3- 4	3 5/R	+ 1/8	+3.5
O	COMPUTER EXCHANGE	1- 1	1/4	0	0.0
A	COMPUTER INVSTRS GRP	2- 8	2 1/2	- 1/8	-4.7
O	COMP. INSTALLATIONS	1- 2	1	0	0.0
N	DATRONIC RENTAL	2- 3	2 1/4	0	0.0
A	DCL INC	1- 3	1 1/8	+ 1/8	+12.5
A	DEARBORN-STORM	12- 26	14 7/8	+ 3/8	+2.5
N	DPF INC	5- 9	4 3/4	- 1/8	-2.5
O	EDP RESOURCES	1- 3	1 1/2	0	0.0
A	GRANITE MGT	7- 6	2 3/4	0	0.0
A	GREYHOUND COMPUTER	3- 6	3 3/4	0	0.0
A	ITEL	4- 12	4 7/R	0	0.0
N	LEASCO CORP	8- 1R	11	+ 1/2	+4.7
O	LEASPAC CORP	2- 8	2	- 1/8	-5.R
O	LECTRO MGT INC	1- 2	1 1/4	0	0.0
O	NGB INC	5- 15	4 7/0	+ 1/8	+2.6
A	PIONEER TEX CORP	5- P	4 5/8	0	0.0
A	ROCKWOOD COMPUTER	1- 3	1 1/8	0	0.0
N	U.S. LEASING	16- 36	21 1/2	+ 3/8	+1.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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EXCH		1973 RANGE (1)	CLOSE AUG 30 1973	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 3/8	+ 1/8	+10.0
A	APPLIED DATA RES.	2- 4	2	0	0.0
D	APPLIED LOGIC	1- 3	7/P	0	0.0
N	AUTOMATIC DATA PROC	39- 94	58 1/2	+ 1/4	+0.4
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
D	CENTRAL DATA SYSTEMS	8- 9	6 1/4	0	0.0
O	COMPUTER DIMENSIONS	2- 5	2 1/4	0	0.0
O	COMPUTER DYNAMICS	1- 2	3/8	0	0.0
D	COMPUTER HORIZONS	1- 6	2 3/4	- 1/4	-8.3
D	COMPUTER NETWORK	1- 5	1	0	0.0
N	COMPUTER SCIENCES	2- 6	2 7/8	- 3/8	-11.5
D	COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
D	COMPUTER TECHNOLOGY	1- 3	1	0	0.0
O	COMPUTER USAGE	4- 9	5 5/8	+ 1/4	+4.6
O	COMRESS	1- 2	3/P	0	0.0
O	COMSHARE	4- 9	4 1/2	- 1/4	-5.2
N	CORDURA CORP	4- 15	4	0	0.0
O	CYBERMATICS INC	1- 3	1 3/8	0	0.0
D	DATATAP	1- 4	1 3/P	0	0.0
A	ELECT COMP PROD	1- 2	1 1/8	- 1/8	-10.0
N	ELECTRONIC DATA SYS.	29- 58	34 3/R	+ 5/8	+1.P
O	INFONATIONAL INC	1- 2	1/2	+ 1/4	+100.0
O	INFORMATICS	2- 6	4 3/8	+ 1/4	+6.0
O	I.O.A. DATA CORP	1- 1	5/R	0	0.0
O	IRS COMPUTER MARKET.	1- 5	1 1/8	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/4	- 1/4	-7.1
O	KEYDATA CORP	6- 12	8	- 1/4	-4.0
O	LOGICON	3- 7	4 3/8	+ 7/8	+25.0
A	MANAGEMENT DATA	2- 5	1 3/4	- 1/8	-6.8
O	NATIONAL CSS INC	18- 42	24 1/2	+ 1/2	+2.0
O	NATIONAL COMPUTER CO	1- 1	3/8	0	0.0
D	NATIONAL INFO SRVCS	1- 2	1/2	0	0.0
R	ON LINE SYSTEMS INC	12- 17	18	+1 1/4	+7.4
N	PLANNING RESEARCH	2- 7	2 3/4	- 1/4	-8.3
O	PROGRAMMING METHODS	21- 25	21	0	0.0
O	PROGRAMMING & SYS	1- 1	7/8	0	0.0
O	RAPIDATA INC	5- 24	6 1/4	- 1/4	-3.8
O	SCIENTIFIC COMPUTERS	1- 3	5/R	0	0.0
O	SIMPLICITY COMPUTER	1- 4	1 3/8	- 1/8	-R.3
O	TRS COMPUTER CENTERS	2- 4	1 3/4	0	0.0
O	TCC INC	1- 1	1/4	0	0.0
O	TYMSHARE INC	6- 17	9	+ 1/2	+5.R
O	UNITED DATA CENTER	4- 6	3 1/2	- 1/4	-6.6
A	URS SYSTEMS	4- 8	3 5/8	- 1/4	-6.4
N	WYLY CORP	4- 11	4 5/8	- 3/8	-7.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	12- 34	13	+1	+8.3
O	ADVANCED MEMORY SYS	5- 23	5 3/4	- 1/4	-4.1
N	AMPEX CORP	4- 7	4 3/4	- 1/4	-5.0
O	ANDERSON JACOBSON	3- 6	3 1/2	0	0.0
O	BEEHIVE MEDICAL ELEC	5- 10	5 1/2	+ 1/4	+4.7
A	BOLT,BERANEK & NEW	6- 12	6	+ 1/4	+4.3
N	BUNKER-RAMO	6- 18	9 1/R	+ 1/8	+1.3
A	CALCOMP	5- 13	8 5/8	+ 1/8	+1.4
O	CAMBRIDGE MEMORIES	8- 15	13 3/4	- 1/4	-1.7
D	CENTRONICS DATA COMP	13- 32	27	+ 1/2	+1.R
O	CODEX CORP	9- 19	10 1/2	- 1/2	-4.5
D	COGNITRONICS	1- 3	1 3/4	0	0.0

EXCH		1973 RANGE (1)	CLOSE AUG 30 1973	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 4	1	+ 1/2	+100.0
A	COMPUTER EQUIPMENT	2- 3	1 7/8	0	0.0
O	COMPUTER MACHINERY	5- 13	8	0	0.0
O	COMPUTER TRANSCEIVER	1- 6	2	+ 1/8	+8.8
N	CONRAC CORP	15- 32	15 5/8	- 1/8	-0.7
O	DATA ACCESS SYSTEMS	1- 3	2	0	0.0
O	DATA 100	9- 18	11 3/4	0	0.0
A	DATA PRODUCTS CORP	2- 4	3 3/4	+ 1/8	+3.4
O	DATA RECOGNITION	2- 3	1 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	2 1/2	- 1/8	-4.7
O	DECISION DATA COMPUT	P- 40	13 1/8	- 3/8	-2.7
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
O	DI/AN CONTROLS	1- 4	1 1/2	- 1/8	-7.6
N	ELECTRONIC M & N	3- 6	3 5/R	0	0.0
O	FABRI-TEK	2- 5	2 3/8	- 1/4	-9.5
O	GENERAL COMPUTER SYS	5- 9	8	+1 1/4	+28.3
N	GENERAL ELECTRIC	56- 76	58 1/4	-1 5/8	-2.7
N	HAZELTINE CORP	5- 9	5 1/4	+ 1/8	+2.4
O	INFOREX INC	5- 23	5 7/8	- 7/8	-12.9
O	INFORMATION DISPLAYS	1- 2	1/4	0	0.0
D	INFORMATION INTL INC	10- 15	10 1/4	0	0.0
A	LUNDY ELECTRONICS	3- 9	4 5/8	+ 1/4	+5.7
D	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
A	MILGO ELECTRONICS	14- 2R	17 1/4	+ 1/4	+1.4
N	MOHAWK DATA SCI	4- 13	4 3/4	0	0.0
O	ODEC COMPUTER SYST.	2- 8	2	0	0.0
O	OPTICAL SCANNING	2- 7	5 1/4	+ 1/4	+5.0
O	PERTEC CORP	5- P	5	0	0.0
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	3- 9	4	+ 1/8	+3.2
O	PRECISION INST.	2- 6	3	-1	-25.0
O	QUANTOR CORP	5- 10	6 1/4	0	0.0
O	RECOGNITION EQUIP	4- P	5 1/8	+ 1/8	+2.5
N	SANDERS ASSOCIATES	7- 1P	9 3/8	+ 3/8	+4.1
O	SCAN DATA	1- 6	1 7/8	0	0.0
O	STORAGE TECHNOLOGY	11- 34	14 3/4	+2 1/4	+18.0
O	SYCOR INC	9- 14	12 1/4	-1	-7.5
D	TALLY CORP.	2- 14	3 5/8	+ 1/8	+3.5
D	TEC INC	6- 9	6	0	0.0
N	TEKTRONIX INC	30- 53	39 3/4	+ 3/4	+1.9
N	TELEX	3- 6	3	- 1/8	-4.0
O	WANGCO INC	7- 13	9 3/8	+ 7/8	+10.2
D	WILTEK INC	8- 18	10 1/2	- 3/4	-8.6
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	5	0	0.0
A	BARRY WRIGHT	6- 13	7	+ 1/4	+3.7
A	DATA DOCUMENTS	17- 22	19 1/P	- 1/2	-2.5
O	DUPLEX PRODUCTS INC	7- 10	8 3/8	- 3/8	-4.2
N	ENNIS BUS. FORMS	5- 8	5 1/2	0	0.0
R	GRAHAM MAGNETICS	9- 20	10 1/2	- 1/4	-2.3
O	GRAPHIC CONTROLS	P- 12	10	0	0.0
N	3M COMPANY	7R- 89	85	+ 3/4	+0.8
O	MOORE CORP LTD	53- 60	52 3/4	-1 1/4	-2.3
N	NASHUA CORP	42- 58	48 1/2	0	0.0
O	REYNOLDS & REYNOLD	40- 51	42 3/8	- 3/4	-1.7
O	STANDARD REGISTER	14- 20	15	+ 1/4	+1.6
O	TAB PRODUCTS CO	R- 23	9	0	0.0
N	UARCO	15- 23	18	0	0.0
A	WABASH MAGNETICS	5- 7	6 1/8	- 1/8	-2.0
N	WALLACE BUS FORMS	15- 28	18 1/8	+ 1/8	+0.6

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